18836

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I

VOLUME 40

IN THE SUPERIOR COURT,

State of California, County of Sacramento.

OCTOBER SESSION, 1881.

HON. JACKSON TEMPLE, - - - - - - - PRESIDING JUDGE.

WINFIELD J. DAVIS, OFFICIAL REPORTER.

SAMUEL OSBOURNE AND WILLIAM M. CUTTER, REPORTERS.

The People of the State of California,
vs.
The Gold Run Ditch and Mining Co.

COUNSEL:

For Plaintiff,

HON. A. L. HART, Attorney General, GEORGE CADWALADER, ISAAC S. BELCHER, A. L. RHODES, RICHARD BAYNE.

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In the 40 Superior Court
of the State of California
in and for the County of
Sacramento.

The People of the State of California
vs.
The Goed Run Ditch and Mining Company

Afternoon Session
Monday
January 16th 1882

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Winfield J Davis
Official Reporter

11619

In the Superior Court of the State of California in and for the County of Sacramento.

The People of the State of California
vs.
The Gold Run Ditch and Mining Company

Monday January 16/82

Afternoon Session.

Testimony
of
Dr. James Simpson
(Resumed)

Mr Belcher I referred the witness this morning to the Report of Dr Stateh in the biennial Report of 1877 and 1879 calling his attention to the sewage of this City of Sacramento

Mr Wadsworth I understand that you produce

11742

as much of this book as refers to this

Mr Belcher. what relates to the sewage of Sacramento, and also in the Report of Dr Stateh still Secretary of the Board, permanent Secretary for the year ending June 30th 1880

Mr Cadwalader. That book was not called to the Doctor's attention

Mr Belcher. Now call it to his attention and propose to read some from it.

Mr Cadwalader. I mean to Dr Stateh's attention

Mr Belcher. Yes sir. Dr Stateh had his books here all of them, speaking of these Cities and particularly of the City of Sacramento he says: "Meanwhile, an effort "has been made to im "prove the drainage of "the City by a plan

11743

"fully detailed in the last
"Report of the State Board
"of Health. It consists, in
"general terms, of earthenware
"or cement pipes laid from
"North to South through
"the City on alternate
"streets, side drains con-
"necting with these
"and the whole ultimately
"discharging into a Canal
"which after a course of
"twenty five miles or more
"empties into a slough
"or lake; from thence it
"flows into the Sacramento
"river. Although the fall
"or decline of the sewers
"is only six inches to the
"block of three hundred
"and twenty feet or, in-
"cluding the alley, of
"three hundred and forty
"feet, and of the canal
"from the Southern line
"of the City to the slough
"only from 5 to 6 inches
"to the mile, it is the

11574

" most, that under present
" circumstances, can be
" obtained; and it is thought
" by the engineer to be
" sufficient to carry off
" the accumulated sewage
" the reflux of the latter
" through the canal,
" and thus into the sewers
" during the high stage
" of the water in the
" rivers and ploughs is
" provided for by a
" flood gate and a cross
" levee. The sewerage
" on this plan is being
" gradually extended
" and improved.
" Yet, the drainage from
" lots and yards is de-
" fective and a serious
" source of danger to
" health. In some cases
" the lots are too low
" to admit of drainage
" and where these are
" occupied by families,
" the waste water from

11545

"the house and kitchen is
" either thrown upon the
" surface to saturate
" and pollute the soil,
" or drained into unCemented
" cesspools. Sometimes
" the same cesspool is
" used as the depositary
" for the kitchen slops
" and for the contents
" of the water closet, or,
" in the absence of the
" latter, a privy is
" erected over it
" In a very large
" majority of cases through-
" out the City, however,
" the privy is a mere hole
" dug a few feet in the
" ground, designed to be
" used until full when
" it is to be covered over
" with earth and another
" dug near by. In other
" yards and for the use
" of those occupying more
" finished residences,
" and for the best hotels,

11546

" cesspools have been pre-
" pared for the reception
" of the waste from water
" closets. These are, for
" the most part, excavated
" in the earth for a certain
" yet varying depth, lined,
" bricked or bounded up,
" the intention probably
" being entertained of
" having them emptied
" when required, or
" when the accumulation
" is greater than the
" natural process of
" percolation through the
" soil can readily
" relieve. In very many
" cases unfortunately,
" this is seldom thought
" of, until in conse-
" quence of foul odors,
" a nuisance is created
" which receives the
" attention of the Health
" officer. In some
" instances the cesspools
" are located in the

11547

"cellar, permitting the es
" cape of offensive gases
" into the rooms above.
" From some familiarity
" with many of the resi
" dences and hotels in
" Sacramento, the writer
" is able, knowingly, to
" say that very many
" of the closets are un
" safe; they are badly
" constructed; for the
" most part cheap and
" inefficient owners;
" and seldom properly
" ventilated. This is
" the fault doubtless,
" in many instances,
" not so much of the
" owners of the dwellings
" as of the plumbers
" upon whom they rely.
" An attempt was
" made in the last Report
" of the State Board of
" Health to explain the
" evils of the conditions
" thus briefly pointed out

11548

" the danger of permitting
" the percolation from
" cesspools to go on from
" year to year; for though
" oxidation will undoubted
" ly take place in the
" soil effecting the
" destruction of organic
" matter, and its con
" version into harmless
" nitrates and nitrites,
" there was a limit to
" this conservative in
" fluence of soil; it
" became, after a time
" supersaturated, when
" chemical reaction was
" impossible. This state
" of things so far as
" regards privies has
" been going upon the
" building lots of Sacra
" mento for at least twenty
" eight years - since the
" Fall of 1852 - when
" everything visible was
" destroyed, perhaps
" purified, by fire

11579

" A block of ground 320
" feet square may con
" tain sixteen 20-foot
" lots, along each of its
" sides. If the buildings
" upon each side were
" equal there would be
" sixty four lots and
" as a consequence sixty
" four privies, open or
" vaulted upon each
" block. How many
" times, during twenty
" eight years these
" privies have been filled,
" emptied over, abandoned
" and new ones dug,
" must be a subject
" for conjecture only.
" Upon the subject of
" subsoil drainage, the
" Civil Engineer in a
" communication published
" in the Report of the
" State Board of Health
" for 1879, remarked:
" As our system of
" drainage as at present

11550

'constituted every particle
'of the rainfall in our City,
'as also the seepage, and
'what is pumped into
'the City, has to escape
'by evaporation, by ab-
'sorption or through the
'sewers. The result is
'that probably during
'the rainy season nine
'tenths of the water
'that enters the City
'has to be absorbed
'by the soil and retained
'until the full of the
'rivers when the heat
'of the sun becomes
'sufficient to evaporate it'.

I also state further that the testimony of Mr Bassett shows as his Report in 1877 and 1879 shows - that the sewers are through 13th, 9th, 7th 5th 3rd and 1st Streets running from the side streets from the American

11057

river down to R. Street, and on R. Street running to 6th Street where there is a main Cut or Sewer that carries it off below, and that these are connected with small lateral sewers in the alleyways. The blocks are 400 feet in one direction and 420 in the other— 400 feet from East to West, and 420 from North to South and that these sewers, the connecting sewers, the lateral sewers are made of wood with three sides of wood and the bottom of earth, that the brick sewers through the main sewers are of brick, the bottoms are of loose brick — Decay of loose brick, not cemented, with open joints. The fall was stated by him

11552

the main sewers if I remember right 6 to 8 inches to the block of 420 feet

Mr Meadowcraft. It is 400 feet from centre to centre.

Mr Belcher. It is 420 feet from centre to centre, that is what Mr Bassett said running North and South, the alleyway increasing the distance. Sixth Street from R. to Y. has a grade of 2½ inches and the drainage canal into which these all empty has a grade of 2½ feet to the 400 feet from 6th and Y. to the Riverside Road, and from the Riverside road onto Sutterville it is 1¼ inches per 400 feet and below that it has a grade of from 4 to 6 inches to the mile.

that the area of the City is about 2 square miles. With this statement in regard to the sewerage system and the system that prevails here what do you pay in regard to the saturation of the soil?

Mr Cadwalader. That is not a technical question

Mr Beleher. It is what would follow of necessity

Mr Cadwalader. That is not a technical question

Mr Beleher. If it is not a technical question it is such a question as a doctor should be best prepared to answer who has given that subject his attention

The Court. I should think so. She may be an expert on that subject

Mr Beleher. Answer the question

11584 A Such a system of

Sewerage could only result in one thing and that is allowing the contents of the sewers to filter through until the soil is saturated with the noxious material whatever it may be in the sewers and cess-pools. There is no provision made for doing anything else apparently with regard to them. So far as those drains made with vitrefied stone pipe, those of course would not allow evaporation of the Cess pools & Privies with sewers constructed of wood without any bottom and sewers constructed of brick without any cementing would of course allow the contents to infiltrate into the soil and saturate it with the material it might contain

Q I will state to you further that it was stated by Mr Basset who is the Engineer of the City that the water

11000

Closets and privies should not
allowed to connect with the
sewerage system for the
liquid portion. The solid por-
-tion of the excrementa was
excluded entirely and that
very few privies except those
connected with the larger
hotels or the larger estab
lishments had any connection
with the sewers of any sort.
What effect must necessarily
follow from the digging of
shallow privies and when
they are full covering them
over and digging others
in there immediate neigh-
-orhood?

A The saturation of the soil
with the contents

Q Suppose that we adopt
the germ theory, that is
is a living germ whether
it be vegetable or animal
No matter — after that once
comes into flowing water what
becomes of it

11506 A It is carried in the water

for a distance unknown and if the water is used for any purpose, if there are drank by human beings the germ may be carried into the system in that way.

Q How many towns are there within the drainage area of the Sacramento here from Sacramento Northward?

A Well there is a large number on the Sacramento Red Bluff Tehama, Chico, I suppose Oroville.

Q Oroville is on the Feather River but within the drainage area?

A Well it runs into the Yuba and the Yuba into the Sacramento. Then there is Nevada Marysville

Q Nevada and Grass Valley?

A Yes sir of course one trails into Deer Creek and the other into Wolf Creek and

11557

Deer Creek finally empties into the Yuba and Wolf Creek into Bear River and Bear River into the Sacramento. Then there are other towns — Auburn Placerville those I suppose empty into the American there sewerage or whatever filth material into some branch which ultimately empties into the American and finally into the Sacramento

Q Do you know of your own knowledge whether Typhoid fevers have been known along any portion of these streams or in any of these towns in years that are gone?

A I have no doubt from my own knowledge. I have seen typhoid fevers in several of those towns and I suppose it has prevailed Judging from the Mortality reports in all of them or some time during the past

11508

and probably it does every year.

Q Well now if that disease be dependant upon living germs and the water supply of this City for domestic use, drinking and domestic use be taken from the River and the well water in the City not used from what source would you say that the disease if it occurred here should come or might come rather?

A It might come through the water, There is this no doubt that running water is supposed to be able to quickly purify its self and the sewerage of those towns running into any of those Rivers would very likely be purified to some extent. In deed it is a mooted point with the authorities on this point whether absolute distruction of the germ ever takes place.

11559

That it is more or less
dilution to such an extent
as to render it possible
that in using the water in
small quantities it is im-
possible that you would
drink a living germ; but
the point so far as I know
has not been determined as
to how long those germs
would live or the distance
they might be carried, but
a person in drinking might
drink a portion of the water
that contained one of those
germs which might have
been carried from Marysville
say on the one side or
Folsom or the State Prison
up above here and when
those things appear the disease
might be propigated in the
system. Filth pollution by
Rivers is a matter that has
received attention in England
and sewerage is prohibited
to be run into sewers in
England for that reason,

11560

the dangers that may arise from it.

Q Assuming that the germs are living whether animal or vegetable we know nothing of the life of them?

A Nothing of the duration of life or the circumstances providing disenfectants are not used but in running water we do not know the length of time that they would retain sufficient vitality to act in the system as a ferment and produce the disease from which they are supposed to originate

Q I will ask you whether you have examined the Mortality tables showing the Comparitive death Rate in the different Cities. Those tables will show for themselves there is no need to ask

Cross Examination of
Dr James Simpson

11561 Q Mr Cadwalader What is your

age ? A Fifty three
Q When was it you went to
Timbuctoo ?
A In the fall. December 1858
Q That was the hydraulic
Mining Camp was it not ?
A Yes sir they were just
Commencing to hydraulic at
that point when I went to Tim-
buctoo leaving the River beds
and Commencing to open our
the hydraulic mines
Q Your patients were persons
engaged in that business
exclusively ?
A not all of them because
My practice was extended
over the agricultural regions
around below Timbuctoo, Tim-
buctoo was in the foot hills
And one of the first mining
points, at least the first
hydraulic Mining point to
any extent. My practice
extended down as far as Dry
Creek and Bear River and
within 6 or 7 miles of Mary-
sville.

11562

Q And when Timbuctoo was
mined away you went to
Smartsville?
A No sir I never went to
Smartsville. I remained at
Timbuctoo until it was nearly
washed away and then I went
higher up in the mountains
to North San Juan.
Q While you were in Tim-
buctoo the soil was constantly
in motion was it not?
A How could it stand up
and still be in motion
Q Well being moved away
by the water?
A The hill that constituted
the mining ground was
being constantly washed away
by the hydraulic process.
The surrounding ground of
course was not.
Q And washed into the Yuba
River
A Washed into the Yuba
River, into what was called
Big Ravine and from that
into the River

1063

Q That is about twenty miles from Marysville?
A It is considered 18 miles from Timbuctoo to Marysville some make it only 16 it depends on the road it varies a little.
Q What were the different types of disease there?
A Well when I practiced down at Timbuctoo I had no intermittent fever or remittant fever either, the usual fever that was there was — well I might call it a species of bilious remittant in Timbuctoo proper, when I passed down on the plain out of the foot hills the diseases were altogether Malarious — of course we had ordinary diseases besides, we had diarrhoe dysentery pneumonia pleurisy and rheumatism
Q So that I understand you that Malarial fever is not a remittant or

11564

intermittent?
A I do not I say Malarial fever always assumes, nearly always an intermittent or remittent form; A Malarial fever is very seldom a continued fever.
Q If you had remittent and intermittent fevers on the hill and went down into the valley and found Malarial fever you did not find a different disease did you?
A To certain extent I did I found a different character of disease, persons residing at Pinnacles at that elevation did not have what we denominate Chills and fever, or Ague.
Q Pinnacles is in no elevation in any sense in which that term is used is it?
A It is upon an elevation above Marysville, above the plains, but the whole elevation above the Sea is less than

1565

400 feet is it not?
A I think not, I am not prepared to say I think it is more than that.
Q Well is it not less?
A Less than 400 feet above the sea.
Q Yes it is lower than Smartsville is it not?
A Yes a little. Timbuctoo was then settled on the side hill when I practiced there. It was elevated considerably above that.
Q We have got the precise elevations here. I think it is about 293 feet according to my recollection. When you went down that hill you went into the valley. Now what kind of Malarial diseases did you find there?
A I found intermittent fever remittent fever, that is if you confine yourself to fevers. I found Rheumatism pneumonia. Phthisis and All the varied diseases in

fact
Q Well did you find any different types of remittent or intermittent fevers in the valley?
A So you speak as compared with Timbuctoo proper
Q No I am speaking of types of those fevers that you found there on the hill at Timbuctoo?
A I found them chiefly as I say of a remittent form, what I denominate bilious remittent, they were not marked by a chill

Q Well what I want to get at is whether there was any change in the types?

A In the type of the disease in the plain

2. Intermittent or Remittent:

A During the time I practiced there I did not perceive any particular difference in the type.

Q Is it not a fact, that no disease ever changes its type?

A Yes you find diseases changing and varying in their character.

Q That is not what I asked you. Do particular diseases ever change in their types. That is, does one fever ever run into another?

A I do think it does. My idea, my view of the matter is that it does not, but you can assume right there that an ordinary intermittent or remittent fever may be prolonged, and produce a great amount of poison in the system, and assume a low typhoid form and result in death.

Q What is the poison that is taken into system in case of

Malarial fever

A The poison?

Q Yes, where does it come from?

A From Malaria

Q Well, what is Malaria?

A Well, Malaria originates — in the first place in Low or — ganic matter —

Q But I ask you what is Malaria?

A I am answering you as nearly as I can what Malaria is and I am stating to you the circumstances under which Malaria is developed, but what Malaria is I would like to know myself. I can answer you as to the circumstances under which Malaria is developed

Q It is bad air is it not?

A You may call it mephitic gas, or bad air or whatever you choose, but it is supposed that the germ that is originated is carried by the air into the system of the person suffering from it

11569

Q But it is a fact that it has never had any other significance either practically or theoretically?

A Malaria?

Q Yes. A. Has had air?

Q Yes, bad air?

A Well, I do not know what construction you would put upon the definition that you would give to malaria. I have not looked it up in the dictionary but I can give you the circumstances necessary to originate malaria.

Q When you left on the hills of Tombstone and went into the valleys, of course you came into a country, that had been injured or covered by debris, did you not?

A Not in my early days. Not when I practiced there, there was no debris outside of the river bed until 1881 or 1882 at the place I practiced - outside of the river bed

Q At what points?

11590

A. I am speaking of along the Yuba and Bear Rivers

Q. There were no changes there? A. No material changes.

Q. What time did you leave that country? A. I left Timbuctoo in 1863.

Q. In 1863? A. Yes,

Q. What time in 1863?

A. I left there in the spring of 1863, April I believe.

Q. That of course was after a great deal of the land was covered was it not?

A. Yes, it was — The first covering of the soil

Q. You said when you got into the valley you found a change in the character or rather you found different fevers prevailing there.

A. I said that during the first 2 years that I practiced at Timbuctoo —

Q. (Infty) No, that is not what I asked you.

11571 Mr Belcher I insist that the

witness shall be allowed to
answer the question
Mr. Cadwalader Very well,
so as, make yr answer
A Previous to 1861-2, to that
Country being covered by this
detrii as yr call it, I found
that the fevers were malarial
and of somewhat a malignant
type but following the deposit
of the detrii, I found less ma-
lignancy in the disease They
were malarial fevers before, al-
most exclusively, but they comed
assume sometimes a typhoid type
Q When yr speak of malignant
fever, what do yr mean?
A I mean a fever that termi-
nates frequently in death, or
where they are very serious
Q That comes not be a proper
answer for a Physician to make
and it, to that question?
A There is a special disease
that we call malignant fever,
or pernicous fever, where the
person will have a chill and
congestion, and death will ensue

11572

in a very few days, but I was not using the term malignant fever in that sense. I am speaking of a character of malarial fevers, which existed there and, which, were malignant or severe in their character - a fever which will prevail and be severe but from which many persons will recover, a vast majority. We have it in all countries and in all climates, and I speak of it in that way because very frequently it is accompanied with a very large amount of fatality

2 Did yr find any malignant fever there in the Yuba valley, before the advent of the debris?

A I did

2 What are their nature and from what did they spring?

A They spring from malaria

2 Owed they be malignant fevers then springing from malaria

A Yes.

2 They owed? A Yes.

2 Do yr call Scarlet fever

11673

a malarial disease?

A I call it a zymotic disease. I do not consider that zymotic and malarial are synonomous. I call Scarlet fever an infectious disease and zymotic disease

2 What do yu call the Mell pox?

A. Infectious and zymotic and sometimes it becomes not only infectious but contagious.

2 Is that malarial, too?

A I cannot so class it. It may be intensified by malaria, and made more fatal.

2 What do yu have to say about diphtheria?

A Diphtheria is a zymotic disease and an infectious disease, and originates from germs it is supposed.

2 It comes from malaria?

A It comes from filth. You can term it malaria or what yu may. If yu mean bad air — If yu. defination of malaria is bad air, that will include it.

2 Will the same cause that

will produce intermittent fever
produce Scarlet fever?

A No sir, I think not.

2 Are Malarial fevers supposed to spring from the contact of a germ with a gland?

A Well, malarial fevers are supposed to spring from germs taken in to the system. They may come in contact with a gland or they may come in contact with mucous membrane which lines the whole interior of the body

2 Now do you not know that malarial fevers such as you know anything about proceed from the stirring up of the soil by the husbandmen in new countries?

A It proceeds certainly - it is influenced by the stirring up of the soil probably as that leads to the decomposition and putrefaction of organic matter which is supposed to engender these germs in some way, and consequently they are intro-

11675

duced into the system.

Q. Can you not have the fever and ague without having inhaled a Solid germ?

A. I am not a great advocate of the germ theory. If you want half a dozen theories I can give them to you & those of that theory — I never saw a germ, and whether you can have those fevers from other causes or not, I can not tell. The ancients believed it was a certain Communication of the humors of the body that produced disease, and I could give you a dozen different theories in regard to the origin of fevers, but the germ theory is generally accepted.

Q. Have the advocates of the germ theory particularly contended that it was the cause of all fevers? A. Yes. They attribute all fevers to germs introduced into the system and that the malarial fevers are developed by the —

11576

11654

2 <Intj> Are its tinguished from such fevers as spring up or accompany the settlement of new countries?

A Those fevers are supposed to be from germs developed and taken into the system. Some believe in a specific germ for every disease while others do not

2 What becomes of malarial fevers, say within 20 years after the settlement of a country? A When the country is first settled and the soil begins to be cultivated, you have malarial fevers, After a time this soil is probably deprived of a great amount of moisture and the amount of fevers of that character decrease. Usually however the settlement of the country with animals leads to filth of various descriptions and the absorption of this filth into the soil - its putrefaction and the influence

11577

of heat and moisture is supposed to develope these germs. They may be developed spontaneously, and consequently the fevers owned be typhoid. If you mean to confine it to fevers only, but besides those owned be produced dysentary, diarhea, rheumatism and Erysipelas

2 Ques. could the inhabitancy of a country for 20 years destroy the germs of what you call the malarial fevers?

A Necessarily to develope—

2 Q. Why? In other words what owned destroy or dissipate or do away with the germs? A Disinfectants

The Court. Q. I asked you whether the cultivation of the country owned destroy them

Mr Cadwalader. Q. You owned the cultivation and inhabitancy accomplish the destruction of the germs?

A It does not, but the diseases are substituted by

11578

Other diseases.

2 Q. Is it not accepted as one by all writers on this subject, that after 20 years cultivation of a country, that breeds these "Malarial diseases" you can look for their extinction?

A Of Malarial diseases?

2 Malarial diseases?

A Not without drainage

2 And remittent and intermittent fevers?

A Not without drainage

2 Yes, without drainage?

A That is not my opinion

2 Now is it not true, that the same causes substantially that relieve a country of the Malarial diseases, create what are called the infectious diseases, such as "Scarlet fever, diphtheria, typhus and typhoid fever"?

A I do not think the cultivation of the country does that at all

2. That is not my question. Do not the very causes that

substantially relieve a country
a new country of its malarial
fever, create permanent fever
such as small pox, scarlet fever,
typhus and typhoid fever?

A. I have associated too
many fevers there together. In
the first place small pox and
scarlatina are infectious dis-
eases and I do not believe
they ever originate of them-
selves without contagion. I
do not think that they have
a spontaneous origin. I think
that every case of scarlet fever
is acquired from some other per-
son that had scarlet fever
and had developed the contagion
and from whom it had been
communicated; and I look
upon small pox in the same

Q. I do not deny that.

A. Now I believe that typhus
and typhoid fever altogether
originate on Island before
from filth. Typhus fever
is usually attendant upon
filth, impure food and impure

11580

air — poor food or a limited amount of it, unhealthy air and unhealthy surroundings

2. I am not asking you about that? A. I can not teach you what a Physician should know. You can ask me questions, and if you are educated up to a Physician stand I could answer them more briefly.

The Reporter read the question

A. I will answer that in one word by saying no

2 What is a fever?

A Well, a fever is Characterized by certain symptoms?

2 No, but what is it that is a fever? A It is a disease that is recognized as generally having a cold and a hot stage and a high degree or at least a certain Elevation of temperature above the Normal Standard.

2 Do you find that is typhoid fever? A Yes, an Elevation of temperature above

11581

the normal standard

2 I ask you whether in Remanent fever you find the cold Stage?

A yes, sometimes you will. You will not find it marked out I think you will find it at the beginning of continued fever — you will sometimes find the cold stage

2 Do not all books on therapeutics say that one of the great aims or one of the four aims of the physician in typhoid fever is to reduce the temperature and get rid of the excessive heat by

A Correct. That is true, but you will find this in all fevers — all fever arise from the poison which is taken in to the system and on the first introduction of the germ into the system the effect is to prostrate or debilitate and sometimes the temperature is lowered for a short time. It may be only for a few minutes or hours

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Q. After that there is an elevation of temperature which sometimes energizes does it not?

A Energizes?

Q Yes? A The fever of course causes an oxidation of the tissues and heat is developed by oxidation the same as in burning fuel

Q What is the difference between typhoid and typhus fever?

A Typhus fever is usually developed among people who are confined in an impure atmosphere, who have unwholesome food and independent of that surrounded by filth. Ship fever, Emigrant fever, and the famine fevers of Europe, and such fevers are usually recognized as typhus fevers. But they run a shorter course.

Q <Intj> It is like typhoid fever? A. Typhoid fever is called typhoid from its resemblance to typhus fever

11583 Q Does it run the same

length of time?
A Typhus fever runs its course quicker
Q How much quicker?
A Typhus fever runs its length generally in 2 weeks
Q You regard them, as you have stated, as substantially the same?
A I said that typhoid fever —
2. Is not the one sometimes called a disease of the brain, and is not the other always an ulceration of the bowels
A The Enteric or typhoid fever of New England, a typical case, and typhoid fever usually as it progresses develops inflammation of the and ulceration of that portion of the intestines and there the lesion seems to be greatest. Typhus fever develops itself sometimes in a congestive form and it is accompanies in its early stages with delirium and you have a more marked delirium and

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a greater prostration of the System causing more quickly It runs it, course more rapidly. In typhus fever the bowels are constipated while in typhoid they are usually relaxed.

2 Yu really do not find any two fevers which are more far apart than typhus and typhoid? A Ya, there is yellow fever. I should think that was Entirely different from either.

2 Yu do not find any two fevers which occupy such polar differences so to speak as typhus and typhoid?

A I can not conceive the bearing of yur question, sufficiently to make an intelligent answer.

2 Is not typhoid fever a disease of the intestines?

A It is supposed that it is produced by a germ introduced into the System and in course of the fever, ulceration or

disease locates itself particularly in the intestines

2 Now is not typhus fever, a disease of the brain?

A I do not consider it so. I consider it a disease originating as I said before from impure air, filth and poor food and by the poison that is thus introduced into the system. It may of course influence the brain

2 And the patient dies in a delirium, here usually depressed?

A And very frequently they do the same in typhoid

2 In typhoid fever he dies from the breaking of an ulcer in the intestines?

A That hemorrhage of the bowels I think takes place very rarely. I have not in 5 years seen a patient die from hemorrhage of the bowels

2 Where is the stool, in typhoid out of which the germ of which you speak rises,

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Where does that became infected?
A The germ.
Q Yes? A. I suppo-
sed that the Ejection from the
bowels of a typhoid patient
contain the poison germ in
abundance
2 Where does that get the
poison stool?
A Where does what, the in-
dividual? In typhoid fever
one germ may be introduced
into the system and the theory
is that it multiplies itself
until the whole system is
affected by it and the germs
are carried off by the bow-
els
2. Tell us where the stool be-
comes affected with the poison
that forms the germ. Where
does it get it.
A Where does the stool get
the germ?
2 Yes. A The stool gets
it from the ulcerated spots
in the bowels.
2 In the intestines? A Yes

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2. That is right. Now do you recognize the fact that it is possible for a germ to come from Owens Valley to the front of this town by way of Bear River, Feather River and the Sacramento?

A Well I never saw a germ as I tell you, but those who have and who has investigated this subject, and the pollution of rivers, say that the distance in which a germ can live and exist and alter the system and act has never been determined, and that it may pass for miles and miles. As to the limit of the distance it may be said that it is not known

2 I will ask you whether rivers as far as your knowledge extends are not used as drains for large cities?

A As we live, and as Sanitary Science progresses we can not judge the future by the past, but the idea—

2 (Int'g) That is a truism. But I want to know whether Lake Michigan do not drain into the river. For instance take Cincinnati?

A I never was there. Take some place where I have been

2 Take Pittsburg?

A I never was there

2 Take Albany?

A. Take Chicago, Chicago river, I have been there.

2 Where is the drainage of Chicago? A Into Lake Michigan.

2 Through what?

A It is carried out through the Chicago river. The drainage runs into Chicago River and is carried into Lake Michigan

2 Chicago is divided into East and West Chicago?

A Yes.

2 And the Chicago River is the boundary line? A Yes.

2 The drainage of the City is into the Chicago River?

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A Yes, into the Chicago river and that carries it into the lake.

2 Take the drainage of St. Louis? A I never was there

2 Take the drainage in New Orleans? A But St Louis is one of the cities —

2 New Orleans?

A I never was there

2 Take Memphis, Vicksburg?

A The drainage of those cities recently has attracted a great deal of attention

2 Take Nashville & Louisville

A Take Newyork. Take some City where I have been. I have not travelled through the South

2 Where does Newyork discharge its drainage?

A It discharges its drainage into the bay, and some portion into the North River and some through —

2 (Duty) Is Newyork on a Bay? A It is on

an island
Q Does it border on a bay or on a river?
A There is a river on each side of it.
Q And no bay?
A There are the Narrows there and there is the Sound runs up there
Q Come to the center and tell us whether all the large cities that you know anything about situated on the banks of rivers do not drain into the rivers? A They have up to this time but just now London has prohibited the drainage into the Thames and the same in England generally.
Q You have not been to London?
A I have.
Q When? A I was there in 1875.
Q How long were you there?
A I was there about four months.
Q In London? A Yes
Q You never were there before

or since? A No sir, never before nor since.

Q You were not studying the subject of drainage when you were there those four months?

A No sir, I was not. But, at the same time, the general curiosity which is implanted in human nature made me observe the Thames

Q You never lived in a city as a physician —

Mr Belcher I insist that the witness shall be allowed to answer in regard to the drainage of London. I insist that he shall state fully in regard to that.

The Witness So far as London is concerned the pollution of the Thames excited the attention of the whole people of England.

Mr. Cadwalader I object to that

The Witness I do not care about answering it, I should like to get through

11592 The Court. I presume he has

answered it sufficiently. He has states that formerly it went into the river, and that now it does not. An objection has been made.

Mr Cadwalader You never practiced as a physician in a town that was not built on a hill have you?

A Yes, I practiced in Caldwell Maine for three years

Q Timbuctoo is on a hill, is it not? A That was in the State of Maine, it certainly was not on a hill

Q I am asking you whether Timbuctoo is not on a hill

A Timbuctoo is on a hill

Q So is Grass Valley?

A Grass Valley is in a valley so called

Q That is a high elevation?

A It is some 3000 odd feet I think, but it is certainly not on a hill. The only settlers called in Grass Valley because they found a valley there with

pass passing in it?
2. Q. Have been in San Francisco how long?
A. I have been there since the winter of 1873
2 Q. Does do I understand you as wishing to say to Mr Belcher - Mr Belcher (Atty) He is not talking to me.
Mr Cadwalader As having said to Mr Belcher that the disturbance of fecal matter by water does not spread the disease germs
Mr Belcher That is not what he said at all
A. I do not know that I made any remark about the disturbance of fecal matter by water
2. You spoke on the authority of Doctor Buhl?
A. Yes
2 Q. Do you mean Dr Buhl or Dr Budd
A. I mean B-u-h-l
2 Q. Not B-u-d-d
A. No sir, you spoke of

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Budd. Budd is a New York man or was at least

Q He is a high authority on fever.?

A I am not familiar with his work on fever. But I think an English author of that name has written on fever, but I have not read his work. It is an old work, it was written before the germ theory was advanced

Q You have not, I believe, endorsed what Dr Buhl said, have you. You have not done so specifically?

A My own observation coincides with the investigations of Pettenkofer and Buhl, that the higher the water level, the less typhoid fever

Q What?

A That the higher the water level, the less typhoid fever

Q Suppose you take this case: Where the vaults are dry say 20 feet deep

in a stratum of sand substantially close to the water Now say that this matter is deposited for 3/4 of a year and that suddenly that matter is raised 20 feet and distributes itself over the surface of the ground.

Mr Belcher Subject to that. It is a hypothesis that is not arthin the case as shown by the evidence or by any of these reports. The Court will remember the testimony on the part of the physicians here who testified on the side of the plaintiff and also that of one or two gentlemen who had occasion to dig privy vaults, that the ground water, or soil water had risen very considerably higher in these later years than it had been in the earlier years, so that it was very near to the surface, and they could not dig the vaults

to that depth.

Mr Cadwalader Oh no. The testimony was that they dug their vaults here in the month of October

Mr Belcher And that then they ought not dig down to that depth. You are talking of 20 feet

Mr. Cadwalader That is by a regulation of this City. See it is

Mr Belcher The Ordinance of the Physicians is that they are shallow for the most part

Mr Cadwalader I do not think that is so. These matters are regulated by ordinance and by the Health Officer and the surest way to get into jail is to violate it The Witness The date of the ordinance will determine that matter, I should think

Mr Cadwalader I want to know the operation of the water in bringing it to the

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surface q.
A The filtration through the soil z.

2. I mean where the water will stand at one season of the year so that it could be 3 feet higher so that the surface is brought but 3 feet higher or say 6 feet down it away, or affecting that part of the soil which is close to the surface

Mr Belcher. Within three or six feet of the surface?

Mr. Cadwalader. Within six feet higher than it would otherwise have been.

The Witness. If you take the water rising up in these closets and privies and liquifying it in such a condition as to allow it to percolate through the soil and then as the water recedes leaving a portion of it there for a short time it would perhaps have a little influence for a very short time but I do not think it would materially affect the health in any way.

Q. Suppose it was spread over the surface?

A. Well, that is another matter. If you take fecal matter and spread it over ~~that~~ the surface without disinfecting it, ~~and so on~~ it would increase of course the poisonous putrefaction and decomposition of it for the time being. Decomposition of such matter, if brought in immediate contact, would,

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of course, be apt to produce disease; but, if you expose it to the air and the purifying influences of the atmosphere, the germs developed are quickly dispersed, and very little influence on health is produced.

Q. Your idea is a germ can not do any harm except by contact?

A. That is my idea.

Q. Now, take this case: Suppose that the bed of the river was filled up so high that the sewage water would force this fecal matter out of the soil, that is, so as to spread it broadcast?

A. There is a difference. My answer would have now to be framed as to whether that was filtrated through the soil or was on the surface of the soil.

Q. I am not speaking now of filtration or infiltration, but I am speaking now of broadcasting it on the surface, coming from the fact that the water rises clear to the surface and sometimes over

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the surface. What effect would that have?

A. And spreading it over the surface?

Q. Yes.

A. While the water was there it probably would make little if any change in the germ, in my opinion, sir.

Q. But would not it broadcast the germ?

A. It would. Developing these germs, a sufficient amount of heat is necessary to multiply them; and while they were developing in water the ground air and of course the atmosphere would not become much saturated with them.

Q. That fecal matter from one typhoid patient will sometimes kill 300 persons, will it not?

A. I suppose if the fecal matter from one person were distributed it would produce typhoid fever in thousands and that many of them might die.

Q. Well, would it go through the milk of a cow?

A. Do you mean that the could drinking water and passing it through her system, it would pass out through the milk and that being drank would produce disease in the human body?

Q. Yes.

A. I do not think it would. But I think that very frequently milk gets the credit of having these germs. It has been proven however, where the milk has been tested, that it is caused by the milkman's polluting it with water from a well containing the germs.

Q. You think there could not be such a case?

A. I think not. I think it would be hardly possible for a germ to work its way into the cow and then pass out of her system in the milk. I should think the action of the digestive juices of the cow would destroy the vitality of the germ. At all events that is a mere matter

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of conjecture and opinion on my part. I have no scientific data to go by with reference to that. But I would doubt it passing through the cow and contaminating the milk she gave and thus communicating disease to a human being; although the milk of swill fed cows, or of cows that are improperly nourished, where the treatment and food are such as to produce disease in a cow, would be this disease and might communicate disease in that way.

2. Say I have in my alley a cesspool that is 20 feet deep and a deposit of matter is made there. That winter it has not happened to be wet, so it remains there all winter into spring. The next winter it happens to be very wet and that fecal matter is brought by the operation of water up, up, up until it manifests itself right on the surface

of the ground. Now, which condition of that sewer or of that cesspool would generate the most typhoid fever? That is, suppose that there was a stool, a typhoid stool in the sewer during each year?

A. I think the dry year it would likely develope most, because decomposition would ensue and mephitic gases would be generated in the bottom of the cesspool which would filter through the soil, form the ground air and work its way through the porous soil to the surface carrying those germs. I think on the contrary when the water is high and would force it up, that the influence of that would be to lessen the activity of those germs and that consequently they would not be distributed through the atmosphere to the same extent. I would think the cesspool, or water-closet, without

water to any great extent, would develope these gasses by the putrefaction or the decomposition of its contents and that those would penetrate the porous soil and, if not coming in contact with water, that this ground air would gradually work its way to the surface and be distributed through the atmospheric air and consequently inhale in that air and consequently produce disease. It would be more liable in my opinion to do it in that way than if buried up in water.

2. Then it would be the effect following from that, that we should have less typhoid fever than in the years before the filling up of the streams?

A. I do not know that your streams, as this sewerage system is illustrated or pointed out to me, have anything to do with this.

2. Do not give me a speech but

just answer the question.
(The Reporter read the question.)
A. Yes, it would.
2. I suppose you wanted to create malaria in a district, say in such a district as Sacramento, how would you go to work to do it in any better style than by turning these environs into a swamp?
A. I do not think I could do it in any better way than that. I do not know that I could do it in any better way than that.
2. You would want to surround the city with a swamp in order to increase the malarial fever?
A. I would want to make a swamp of the city.
2. I mean the city contiguous territory?
A. I would not endeavor to influence the contiguous territory at all. If I wanted to create malarial fever in the city I would endeavor to protect the swamp of the city and then furnish the

necessary conditions. Those would be the organic matter, heat and moisture, and this limited amount of water. Then I would have the conditions under which I generate malaria. I would not you accomplish the same ends, though perhaps in a lesser degree, by having the contiguous territory a swamp.

Mr Belcher. I make the objection that this is not in cross-examination.

The Witness. Of course if I had all the contiguous territory of swamp and the city was in a hollow I would certainly have it a swamp still, because water seeks its level.

Mr. Cadwalader. Now could you do better than to bring the water so near the surface that the ground could not be cultivated in the cultivating season.

Q. If I had the water so near the surface that the

ground could not be cultivated there permanently —

Q (Duty) No. That is not what I ask you. Could you do better in the way of creating malaria and malarial fevers in a city than to ~~bring~~ the water right to the surface and keep it there during the cultivating season?

A. I do not think I could. I think I would develope malaria that way.

Now, if there are any causes here or hereabouts which make the environs of this city a swamp and bring the water so near the surface that the ground can not be cultivated at cultivating season, you have the highest possible condition for the existence of malarial fever near its aggravated forms?

A. If I can not drain the city or if you can not drain any place you have the con-

-ditions under which you can
develope malarial fever, cer-
-tainly, in an aggravated form.
Q. Do you know Dr. M. M. Chip-
-man of San Francisco?
A. I do.
Q. Did you hear his report
on Medical Topography, Meteor-
-ology, Endemics and Epidemics
etc. made to the Medical So-
-ciety of the State of California
at the annual session held
at San Francisco April 1880?
A. I heard a portion of it read.
Q. On the subject of mining
debris deposits?
A. Yes. I thought it was not
fit for a medical society and
left when I had heard a part
of it read for the reason that
I did not think it influenced
the society particularly. It
seemed to me to be written
for an object more than for
the information of Medical
men.
Q. It was on the subject of
Mining Debris Deposits?

A. I know it was But a great many positions he takes there are untenable and I doubt whether he wrote that himself or whether it was somebodyelse.

Q. I will read you this and see what you say about it:

"The enlarged area of submerged
"lands and the obstruction to
"drainage, greatly tend to in-
"crease the extent and frequency
"of malarial disorders; and phy-
"sicians of experience in the
"affected districts state that
"the fresh deposit itself ~~contents~~ contains a
"principle which engenders
"disease that partakes of the
"typhoid character, and is
"much more difficult to manage,
"and more liable to a fatal ter-
"mination than the simple ma-
"larious fever which prevailed
"before the advent of debris. And
"in the cities of Marysville and
"Sacramento the water level
"has been so much raised
"on the outside of the city
"levels, as to obstruct the drain-

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"age and discharge of sewerage
"during a long period of each
"year, which adds another
"serious evil to the many imposed
"by these deposits."
Q. You are not dying, and I will bet Dr Chipman knows no more about your sewerage than the sewerage knows about him. He does not know whether you tail into the Sacramento or the american 2. Well he says here that the coming down of this material and its deposit has increased the frequency and the nature of the malarial disorders. Is that true or false?
A. Does it not say there that the physicians resident in this place say so, not he himself?
Q. It does not make any difference whether he says it or not. What I ask you is this: whether the deposit of this debris surrounding say, such a city as Sacramento and the immediate growth of organic matter in time and the raising

of the water level making the ground as you call it sodden, in your reply to Mr. Belcher, does not ; not only increase the malarial disorders but also their nature?

A. I do not agree with any position Dr. Chipman takes on that. I believe that the debris from the mountains, so far as it is uncontaminated by the alluvial soil and organic matter that comes down, is of itself a disinfectant and that instead of increasing malaria it would have a tendency so far to absorb the malaria and to neutralize it up to the point of saturation. Beyond that it would have no influence.

Q. Now, I will ask you this question ; whether the mining debris which you saw cast into Big Ravine did not necessarily come in contact with soil having organic matter in it, and so down to Marysville?

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A. A very small proportion it might possibly. Big Ravine is a ravine with rocky sides and bottom. That was scoured out and was filled up with this debris, which would pass along. The bottom of the river itself would be very much like that of a recently constructed ditch. For a time it might absorb a certain portion of what is called alluvial soil, what might be mingled with it, and it forms a coating along on the bed.

Q. What kind of vegetation springs out of it?

A. There is not much vegetation upon the debris of those mines.

Q. I will ask you if ~~any~~ in every instance you know of willows and cottonwood have not followed on the advent of the debris?

A. After it is spread out upon the plains there seems to develope or to have lodged in some way enough —

Q. <Int'g.> But I am speaking

now of this debris which you say swept down from Timbuctoo to Marysville, only 20 miles off?

A. I speak of Timbuctoo and the Yuba River around there. Where the debris is there are willows until it comes down and spreads over the plains. There there are willows but the seeds of them existed there before the debris was deposited.

Q. How far does it go before this vegetation will spring out of it?

A. I think it comes very quickly.

Q. Within a few miles?

A. Probably. Say ten miles; after it goes so there is not much fall.

Q. Now is there any of this debris to speak of east of Marysville that has not a very heavy growth of these willows and cottonwoods?

A. I know nothing of it. I have not been there.

Q. Do you not know it

A. No, I do not. I have not been there. I have not been in Marysville for sometime.
Q. You have read something on the subject- have you not?
A. Oh, I have read. But I think you asked me for my own knowledge.
Q. You disagree with Dr. Chipman on that subject?
Mr. Belcher. When he says he does not know that- is a sufficient answer.
The Witness. Dr. Chipman says it- is covered with willow growth etc. and as far as his statement- is concerned on that point- I have no reason to doubt it.
Q. He is right there?
A. That I do not know. I have not had occular demonstration but as far as I know I have no reason to doubt it.
Q. You say that- the rivers have been contaminated by sewerage from Marysville?
A. yes.

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2. And that you have never been there?
A. I did not say that. I said I have not been to Marysville for the last 15 or 16 years.
2. When you went there you did not see any of those willow and cottonwood swamps?
A. There were willows and there were cottonwoods. There was the Covill and orchard.
2 Do you not know that not a gallon of sewerage has escaped out of Marysville, or can escape owing to the filling of the rivers there? Do you not know that the sewers of that city have been submerged to a depth of over ten feet?
A. I was not aware of that.
2. Do you not know that Marysville did drain into the Yuba?
A. That is what I say. And I supposed it still did.
2. And had fine drainage. Do you not know as well as anything in the World that the debris in those rivers has

covered up the mouths of the sewers and no sewerage can escape from that city.
Q. If I had reflected on the matter I should very reasonably suppose it had. And when I said I supposed it still drained into the Yuba, I simply supposed, certainly as the city was on the banks of the river, that it had sewage outlet at the same place.
Q. Now do you not know that at one time the sewerage of Sacramento was in the river?
A. I do not know it.
Mr Belcher. The proof is right to the contrary.
Mr Hunt. Subject to counsel always answering questions propounded.
The Court. There is not much presumption that this witness knows about it.
The Witness. I know nothing about the sewerage of Sacramento except what I have read in Dr. Hutchis reports.
Mr. Cadwalader. What do you call the typho-malarial?
A. I said before that typho malarial fever was a term that originated chiefly, during the War of the Rebellion that the surroundings of malaria and filth were both necessary to its production.

Q What is it? A It is a fever malarial in its origin but assuming a typhoid form

Q Then one type would run into another would it not? Ans you still have the same disease, But the word "typhoid" is used probably because it resembles in its debilitating or prostrating character, typhoid fever

Q Is that a medical answer? Ages

Q A man then with a remittent fever could shake it off or it could run right into typhoid?

A I did not say so. I said typho-malarial fever was a fever malarial in its origin but assuming a form so far as debility and some of the symptoms were concerned, resembling

typhoid, but I did not say it run into a typhoid, because it does not produce the lesion of typhoid fever on the glands and intestines

Q Do typhoid fevers get frozen out when the weather gets cold?

A no.

Q Does the cholera?

A no. I do not think the cholera does. Yellow fever, it is said by those acquainted with it is killed where the temperature reaches a certain point. Frost it is said destroys the germs of yellow fever.

Q Do you call cholera yellow fever? A no.

Q Why did you do it in your answer to Mr Belcher? A. I did not. I said it would come under the head of diseases called filth

diseases. I was requested to enumerate the diseases which originated from filth

Q Oh yes! I guess that is so. What grade should sewers have?

A They can have various grades. You can have the grade of a sewer as it is in the streets of the City

Q What is the minimum grade? A There is no minimum exactly. A minimum grade for a sewer — it would depend on the size of the sewer and the amount of sewage matter you wanted to carry off There are some sewers in San Francisco absolutely flat. They are almost continuous cess pools because there is no drainage to them There are others again

that have quite a grade, California Street in particular has an immense grade

Q What is the minimum grade of a sewer?

A I could not answer as to the minimum grade of a sewer

Q. What would you call a fall of 2½ feet to the mile? Q What would be a very light grade

Q Does much or too little?

A Too little if anything, although sewers may carry it off pretty well with that grade. It would depend on the contents.

Q Do not authorities say that is sufficient?

A It would depend on the character of the sewage you wish to carry through it. It would not be sufficient for sewage of considerable consistence without you

had quite a quantity of water to flush it off

Q Do not we have quite a quantity of water in this town.

A Dam not speaking of this town but am answering the question you put me whether 2½ feet is sufficient fall for a sewer

Q Have you not read in Dr Hatch's Report that the sewers here have 2½ feet fall?

A He gives it at 6 inches to the block in some instances, In this Report he varies the grade of the sewers. Some of them he places at 5 or 6 inches to the block — 400 or 420 feet

Q That would be 4 and 5 feet to the mile?

A yes.

Q What do you understand the sewers in

this City to be made of?
A I have understood them to be made of wood; I have understood them to be made of vitrified stone pipe, and I have understood them to be made of brick.
Q What proportion of wood? A The proportion I have not learned
Q Do you not understand that nine tenths of them are made of brick? A I do not understand the proportion. I understand there is considerable sewer made of this iron stone or vitrified stone pipe, which makes a very good sewer
Q Is it not a fact that nine tenths are constructed of brick and only one tenth of wood?
A I think brick sewers

that are open and allowed percolation of their contents into the soil are much more injurious than iron-stone pipes which are perfectly impervious to the filtration of the liquid contents.

Q That is not what I ask you. You take good care not to answer the questions I ask you. A I mean to answer you just as I understand you

Mr Belcher And you do it

Mr Cadwalader Q I asked you if nine tenths for the sewers constructed of brick and one tenth for the sewers constructed of wood was not a fair proportion. Is a brick sewer better than a wood one?

A A Brick is better.

11624 A than a wood one?

Ayes.

Q What kind of sewerage do you have in San Francisco?

A We have all sorts.

Q What made of?

A We have wooden sewers, we have brick sewers and we have this iron-stone pipe

Q Do you not know that the great proportion of the sewers in all the Cities of the United States as well as in all the Cities of England is made of brick?

A Ayes. But Dunderstand there is this difference between your sewers and those: those are plastered with Portland cement or water-proof cement. Yours I understand are open so that they allow the contents to filter through

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Q Do you find no fault with the grade of these sewers do you?

A Not to any extent?

Q. What are proper regulations about sewering and water closets in a City?

A The regulations in San Francisco: that all cesspools constructed shall be made of brick four feet thick, cemented with water proof cement of a certain thickness and made so that the contents will remain there without percolating through the soil. There is then a law further that compels, immediately a sewer is put in a street, the putting in of patent water closets and the connecting of the house and water closets with the

sewer, the cesspool to be pumped out with Odorless machine and filled up

Q. That is a regulation in regard to the water closets. A. Yes.

Q. Now suppose we have a regulation of water closets here that is substantially as you have stated; that would be all that was needed on that score would it not?

A. I would want to know what sort of water closets you had; whether you had any of the recent patterns. The old water closet I consider as hurtful as almost no water closet at all, or no patent arrangement, because it generates these mephitic gases and allows them to escape and

carries the sewerage no farther than that. If you use Smith's patent Water Closet or Jenkin's or Melville's where you have large ventilators carrying off any mephitic fuses that are generated to the open air, and independent of that, a separate system to the water closet from that of the waste waters of the house. You would have a good system.

Q You would have to have a Stealth Officer who inspects these things.

Ages.

Q Now if Sacramento has a Stealth Officer who does inspect these things, and has too the Regulations you speak of about water closets, she would have done her duty in that respect would

ple not?

Mr Belcher. We object that this is not within the line of cross examination

Mr Cadwalader. I am going to put your hypothetical question now:

You do not find anything in this Chart that throws any light on this subject do you?

Ans, nothing of any moment except an outline of the sewerage system.

Q And all through his report. I suppose you understand the Doctor is speaking kind of figuringly?

Ans. purtully so

Q That is the way Doctors always write is it not?

A The duty of doctors is to prevent diseases as well as cure them.

and if they can warn people they may prevent much suffering

Q It is the part of the profession of therapeutics to furnish the remedies is it not?

A That is so

Q You have never examined the sewerage of this City have you?

A No

Q The sewerage of the high grade?

A I know nothing about the sewerage, as I said except as was shown me.

Q You came here last evening?

A Yes.

Q And came by request of Mr Belcher?

A At Mr Belcher's request

Q You are not engaged in mining are you?

A I am not. I do not

ever a dollars worth of mining property any where

Q And I hope you won't

A I hope I won't too. I have had enough of it

Q Where you have found this diphtheria on the hills you have generally traced it to the water closets have you not?

A Usually to some decomposing animal matter.

Q. Children frequently go to the water closets 10 or 15 or 20 times a day sometimes? That might be the cause of it?

A I would rather suppose that the water closet and probably the urine, in fact animal excreta filtering through the soil or even possibly on the surface of the soil, running over and passing in?

Q. On a hill would not it go away? For instance you take a sand hill in San Francisco?

A On a sand hill it would probably, a great deal of it percolate through the sand and from the sand percolate into the wells

Q. Is there not perfect disinfection when the earth is drained?

A yes.

Q. Naturally you would not look for diphtheria on a hill top? A no not unless they had created filth around them or originated it.

Q Now I suppose you will say that the creation of a swamp on the north side of this City, two miles

one way and a mile the other, combined with the ~~filling~~ raising up of the water bed so that the original surface of the ground becomes softened and remains softened for three or four months in the year and the water is so high that the drainage canal cannot be operated, that those causes, those three causes would tend to the production of malarial disorders so that so?

Mr Belcher. I object to that as not in cross examination.

Mr Loadwalader. The exaggeration of the type in all malarial disorders causes the greater possibility of these floating germs coming in contact with the human glands? Do that so?

11711

A Human glands?
They cannot come in contact with human glands. They may come in contact with the skin or the membrane but the glands are all situated under the membrane or skin

Q The body is the great centre of typhoid is it not?

A Of course the body—

Q <int'g> In medicine, does it not breed there and does it not multiply?

A It gains access to the system in some way and breeds and multiplies

Q But is not the body the great centre of typhoid germs?

A These germs having gained access to the human body the human body is like a laboratory and they seem to form

11634

and generate in it

Q Is not the human body the focal centre so to speak of the typhoid fever? Where it breeds and there it multiplies fast?

A In the human body it multiplies. I do not know that any other animal than the human animal is subject to typhoid fever. I am not positive about other animals. I do not know whether they have typhoid fever or not. I have not made comparative anatomy much of a study

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Testimony of Vincent Hook

Called for deft. Sworn.

Mr Belcher Q Where do you reside?

A I reside in Pacheco Valley Contra Costa County

Q Are you a native of this State? A Yes

Q Born in it?

A Yes.

Q What is your profession? A I was educated for a Civil Engineer.

Q In this State?

A Yes in the State University of California

Q You graduated at what time?

A In the year 1876

Q Where have you lived? A I have lived in the vicinity of Pacheco for the last 27 years

Q What is in Pacheco Valley? Ayes

Q Is your family there interested in lands?

Ayes

Q So what extent?

A my family own about 3200 acres

Q And in that Valley?

Ayes

Q State from the time of your early recollection what was the condition of that Valley land, particularly the lower portion and the streams coming into it?

A The lower valley—

Mr Cadwalader Stutg'r What relevancy does that have to this case?

Mr Belcher We think it will have a tendency to show the effect of the natural washing and the filling up of creeks and bays and

11637

of this particular Bay of which you have spoken San Francisco

The Witness The lower part of the Valley was particularly tule land what was called Swamp land. The lower part had a slough, navigable slough and of course into this slough empties what is called Walnut Creek

Q What do you say of that as to its size? Does it come down from the mountains whether it be deep or shallow?

A The town of Pacheco is situated about 4 miles from the Bay or 5 and the Schooners used to come within a few hundred yards of the town

Q Have you a map there showing the topography of the County?

Ayes <producing>
Q Place that right on the desk of the Judge
<Witness explains map to the Court>
Q. Now the surface, what was its condition?
A The surface was level
Q Broken or unbroken?
A Unbroken
Q How were the slopes of the hill sides when you first remember?
A well of course there were natural streams enough to carry off the water from the watershed of the Valley. Since that time there are a great many more than there used to be. There are level pieces of land that have been comparatively cut up by ravines and gulches.
11639 Q Upon what are those

changes dependent that is upon the cutting of new channels?

A well of course I can only give my own opinion upon that subject

Q Very well, you have been acquainted with it during all these years?

A Of course we know the Kurtis surface is pretty old and of late years up to 1862 or 1860 it was comparatively level, unbroken. But since they have been farming on the hills and have farmed this country ~~which~~ it has been more cut up than before this time, The hillsides of course when they were farming in the Valley and when they were undisturbed were not cut up any, but since they have farmed them of course they have been

washed in different localities very badly.

Q Did you point out to the Court the situation of Lafayette?

A No I did not

Q Where is that? how far from Pacheco?

A The town of Lafayette is about 9 miles from Pacheco

Q What do you pay of the amount of washing? A The town of Lafayette is situated in a small valley which in the past since I have known it had but one stream. That stream carried all the water from the watershed. But at the present day there are six or seven channels cut through that small valley and it is completely ruined so much so that the farmers have given up the idem of farming it entirely.

Q. What is the character of the soil?

A It is black adobe.

Q Kind of soft?

A It is pretty hard in the summer time and pretty soft in the winter time.

Q What has become of the debris from these cuts and ravines that have been cut out?

A It has lodged below and above the town of Pacheco, and around and in the town.

Q What extent of country has been covered — of land? A About 2000 acres.

Q Does that appear on the map? A Yes.

Q How is it designated or shown there?

A I have colored the extent of country there on the map

Q With what color?

A I Kind of Turkish color

Q So that it indicates the outline of this that has been covered

A Yes.

Q Is it correctly delineated on the plat? A Yes, as near as I can draw it myself.

Q What effect has this produced upon the stream where it empties into the bay and upon the bay?

A Well the extent of country that is filled in — of course it has obliterated the stream. There is no stream at all.

Q How far out in the bay? You say Chamers used to come up near to the town. How near to the town do they come now? A. This fill has not filled the stream to the bay. It has filled the stream up to about a mile above and below the town, and from that distance on to bay the slough is yet navigable but has to be dredged.

Q Does the tide affect it at all? A I think the

11643

tide has something to do with the lower end of it, and that is why it has not filled up as the dirty water from the river above meets the tide water it is checked and the heaviest part of the sediment settles before it gets to the end of the valley

2. At the red mouth of Walnut Creek, was there a bar?

A Yes. There is a bar there now but I never noticed it particularly until the late years. The schooners used to go in there with ease, but now they have cut a channel there to go around the bar

2 That is an artificial channel? A Yes. a canal.

2 Does that appear on the plat or map?

A Yes. that is on the map

2 and correctly designates the?

A Yes. the part of the canal there now there is a bar formed the same as before

2 Running in the canal?

11644

A. At the mouth of the canal

2. In what bay is that?

A Suisun Bay.

2 Where does the material come from that forms that bar?

A. It comes from the valley above.

2 Pacheco Valley? A Yes

2 are there warehouses there?

A Yes, there have been warehouses there for 20 years

2 Do I ask you about the depth of the fill over this territory which you have spoken of - some 1500 acres?

A No.

2. What is it? A It is from 6 inches to 12 feet.

2 Where is the deepest portion of this fill?

A Right in the immediate vicinity of Pacheco

2 That is of the town?

A Yes

2. What has become then of the town?

1645

A. It has left most of it. They raised the houses every year but they have finally given it up

2. Gave it up and left?

A Yes.

2 How much of a town was there there?

A There used to be quite a town, considered the largest in the County

2. You say it was the largest town in the County?

A At one time it was the largest.

2 Is that town and its location correctly represented on the map there?

A Yes.

2. You have states that there were warehouses there, what became of those?

A Well, as the steam fell off of course there was no use for them, and they were torn down, some of them were, and some are standing there yet. Some were moved down the steam to meet the tide water

2. Were you family - was your father interested in any?

A Yes sir; my father had a warehouse near Pachees, a stone warehouse

2 Built when?

A That was built in 1861, I think

2 what has become of that?

A It is there, about half of it sticking out of the ground.

2 How deep is the free about it? A About 12 feet

2 Now when this stone warehouse was built how far up did the tide come

A The tide came to the town

Q. And vessels you have already stated came to the town.

A Yes sir.

Q And now where is the landing place for vessels and schooners?

A It is about a mile and a half below town next to the bay.

Q How is it with the Creek has the shipping stopped or is it continuous?

A No sir, my opinion is that the creek will be abandoned in a few years. It is about as much expense now to keep it in order for ships to come up as it is worth — as it pays.

Q Do you know Mount Diabolo Creek?

A Yes sir, the mouth of that has been filled up so that the stream has been changed.

Q Does that appear on the map?

A Yes sir.

Q Where did that formerly

discharge its waters into Walnut Creek?
A Into Walnut Creek
Q And now?
A It runs in a different direction (explaining location on the map to the Court) the amount that the creek has been filled up so that it has cut a new channel from about a mile from the mouth of the junction with Walnut Creek, and it has gone into the bay on its own account.
Q How far away from the mouth of Walnut Creek?
A I should judge it is about a mile
Q And within what time has that filled and changed its course? A within the last 3 or 4 years
Q Is there a railroad there?
A Yes sir & have a short railroad. It has been filled up so that it never has been used since
Q When was that built,

between what points
A That road was built from the warehouse so as to strike the slough at a point where we could ship the grain and we extended the rail road along with the debris, as the river filled in, we extended the railroad so as to get to deep water. But it finally filled the track up so much so that we abandoned it Entirely
Q What was the Cost?
A about 40 000 dollars that is the Rail Road and warehouse together Cost about 40.000 dollars.
Q Where this Creek formerly run, Mount Diabalo Creek and the tide water Came up, what is now the Condition + what use is made of it if any
A Raising Potatoes and Corn.
Q Used for Cultivation
11600 A Yes sir

Q How much farming land has been made in there of that which was formerly tule and water?
A About 500 acres I should judge.
Q You say this washing and erosion began when the farmers began to cultivate the hill sides if I understand you?
A Yes sir about that time
Q So long as they were confining there cultivation to the plains or to the plain land how was it then?
A Well it did not appear the slough or Creek, we did not notice any difference in the Creek until after the hills began to be farmed
Q Have you seen in any case an especial erosion as where land had been harrowed and ploughed of wastage by storms

coming on after the land
had been prepared
A I have seen places where
the soil has been washed
off.
Q Yes sir I mean an
especial instance
Mr Cadwalader & Dr Glenn
lost 8000 acres of summer
fallowed land last spring
Mr Belcher I am willing
to admit that that 8000
acres was washed to a very
considerable depth
A I have seen rolling land
that was put in in good
order and after a heavy
storm came on it it gul-
ched it up so that it
looked comparatively like
the teeth of a saw.
Q Cutting holes or little
trenches?
A Yes sir Cut little tren-
ches down the slopes. To
prevent this we harrow now
with the contour of the
hills so as to check the

1602

water as much as possible
Q Which way is the plough-
ing there around the hill?
A Yes sir.
Q Following around the hill
A Yes sir following around
the hill. Of course if a man
ploughed up and down the
slope it would wash in
gulches.
Q Have you made any
computation of the quantity
in yards of the wash at
Pacheco and the deposit
upon this 2000 acres of land
that you have spoken of
A Well I have made a
rough estimate, I should
judge that the filling has
been on an average of
about two feet and the
general rule is at the
rate of a foot deep to the
Square Mile is a Million
Cubic Yards and two
feet deep would be two
Million Cubic Yards
Q Mr Cadwallader I move

11653

to strike that out as encumbering the record.
The Court Or dont do any harm
Mr Belcher If there are four Square Miles
A Then there would be 8 000 000 Cubic yards
Q Were the hill sides there timbered in your early recollection — Covered with timber
A Yes Some of them were timbered.
Q What has became of that timber?
A The timber has been cut off in some places. The wood has been used for fire wood and the land has been used for farming.
Q Has the Cutting off of the timber produced any effect to your Knowledge?
A Yes sir it appears to effect the land somehow. It washes more and after the old stumps and roots have decayed occasionally

you see land slides? Of
Course as long as the trees
were standing the roots
held the soil together to
a certain extent and keep it
from sliding. Of course these
land slides are not very
extensive.
Q The hills there are not
very high?
A No sir.
Q And the grade of the
hills how is that sharp?
A No sir Rolling — well
there are some sharp hills.
Some sharp slopes and
some rolling?
Q Are you acquainted in
those portions of the County
following around that mountain
A Yes sir.
Q The Mount Diablo
range?
A Yes sir.
Q Have you seen like effects
produced elsewhere
A Yes sir I have seen the
same effects produced every—

11655

where where farming is
Carried on
Q Where else have you noticed
the filling up of Streams and
the low bottom lands adj-
oining the bay?
A I do not know of any
other particular place that
I have noticed
Q Where your attention has
been brought to is that is
what I desire to know. I
did not know but what
your attention had been
directed to some particular
place other than that
A There are some cases
occuring further up the
Stream about six or eight
miles, the same changes
are taking place there as
are down around Pacheco

2. Are yn acquainted fur-
ther down in the County as
at Pinole, where these creeks
come in San Pablo?
A Nosir I am not acquaint-
ed with them

Cross-examination
of
Vincent Hook

Mr. Cadwalader Yn are the
son of Sheriff Hook of
Contra Costa? A Nosir
2 Where does yrn father
reside? A He resides
on a ranch close to Pacheco
2 Close to Pacheco?
A Yes.
2 How far is Pacheco from
Martinez? A It is considered about 5 miles, that
is by the Martinez and
Pacheco road
2 That is on the side of
Mount Diablo is it not?
A No sir.
2 It is in the road to

11607

Amador Valley?
A Yes, there is a valley called Ignacio Amador Valley
Q I. it on the road to Amador Valley — Pacheco?
A I do not know where that is
The Court. Livermore valley?
A You can go from there to Livermore yes
Mr Cadwalader What is your business? A Farmer
Q Where do you farm?
A We farm in the vicinity of Pacheco, about 2 1/2 miles south.
Q About 2 1/2 miles south?
A Yes
Q You are on the hill? A No sir in the valley
Q You are not on the creek are you? A Yes.
Q Do you know what an estuary is?
A I think I do
Q What is it? A An estuary is the mouth of a stream where it empties into a river? A. It is a

11608

Mountain Stream that runs
into arroyo?
A The mouth of a stream
2 Excuse me A. That is gen-
erally wider than the mouth
of stream. It is caused by
the tide water washing the mouth
a considerable distance —
a considerable extent
2. It is not a stream at
all, is it?
Mr Belcher Object to that,
it is not in Cross Examina-
tion. We are not keeping a
school here for the study
of Geography
The Court. He has given his
idea of it
Mr Ladd Well, there is
no natural water in Pacheco
Creek to float anything in
there? A It is not
a very large creek, it is
dry in the Summer time
and of course it is only a
creek that carries the flood
water off from the valley
2 and the Estuary. You

Can punt over it any place can you not?

A. If you were pretty good on the punt, you might

2 How? A. A Person pretty good on the punt, might.

2. It is very narrow as you go up to Pacheco is it?

A I suppose it is 60 feet wide.

2 And some place it is not more than 6, is it?

A I think the narrowest place is about 50 feet

2. They do not run schooners in these Estuaries where it is not over 6 feet wide, do they not? A. I suppose they might if the schooner was small enough.

2 Do they not run right through at Martinez?

Mr Belcher Schooners 20 feet beam?

A "A schooner that will carry grain as we generally have them there, is about 20 or 25 feet wide

11660

Q These Schooners or the vessels that went up to Pacheco always navigated the salt water did they not, the tide water?

A Yes, principally.

Q There is no other water there in the summer, is there?

A No sir, the creek was a slough from the bay to within the vicinity close to the town of Pacheco, and of course this slough had a regular flow of tide water in the summer time as well as in the winter, and they used navigate that stream in the summer as well as in the winter time

Q Pacheco must have been about as low as the bay then?

A Yes, well, there was about 6 or 7 feet, may be 10 feet rise

Q It used not be higher than the tide? A No sir,

Q They used not navigate it at all at low tide, used they?

A Not very well, no sir. They generally went up to the wade-

house and loaded. They went up at high tide and loaded and went out at the next tide. They comes and get back with the high tide

2. There was tule growing in front was there not?

A In front of the town of Pacheco?

2 Not sir, at the mouth of the Estuary?

A No sir, there is no tule there now.

2 Where was the mouth of the estuary. How far north of Martinez?

A Well, it is about, I can not tell exactly, but I guess it is 6 miles East, North East.

2 6 miles East. Where does the railroad cross it?

A At Avon Station

2 At what?

A At Avon Station

2 How far is that from Pacheco? A About 5 miles, or 6 — 5 or 6 miles

2. Is that up in the land

1662

that sinks? A Yes. ~~[illegible]~~
This a part of the land that sinks is just beyond Avon Station
Q They have never been able to find any bottom there at all?
A No sir.
Q Is that the character of the land that Pacheco is on?
A No sir. That is the character of the land though from within a mile of the town to the bay. I do not know whether it will all sink or not. There is only one spot there that sank that amounted to much on that side of the bay
Q Pacheco must be built on marsh land, is that not so?
A No sir
Q. I do not mean Marsh; rancho, but on marsh land?
A No, it is just on the Edge of the marsh, on the Edge of the tule Swamp
Q Where does the creek commence, or where did the creek

11663

Leave tide water when you first knew it?

A Well, right close to the town

2 Where does the Creek head?

A It heads close to the town what is called San Ramon

2 How far, in what direction?

A The stream runs from the South toward north. I should judge it was about 12 miles long.

2 It runs from the south toward the north? A Yes.

2 You mean it the other way do you not?

A Yes.

2 Where does it head, at the top of Mount Diablo?

A Well, it heads down in toward Haywards or San Leandro

2 Where? A San Leandro.

2 It heads down toward San Leandro? A Yes

2 And it runs north to Pacheco? A Yes.

2 It is what you people call an arroyo, is it not?

A Yes, an arroyo

2 Well, arroyos have the character of the Rhone do they not?

A I suppose they have, but I do not know that they do

2 They are very tortuous, they are deep and have steep banks

Mr Belcher The arroyos Chico?

Mr Cadwalader That was named by the Americans. I am speaking of the arroyos as I think Mr Hood understands them

Mr Belcher And I am speaking of one

Mr Cadwalader Well how deep is that arroyo?

A Well, that depends on the place, On one place where we are farming it is about 20 feet deep

2 With steep sides?

A Yes, steep sides

2 How far apart across, as you would guess?

A I guess the stream way about 70 feet wide

2 Straight banks? A Yes

1665

11743

Q. Running through soft soil?
A It is running through different kinds of soil, adobe land, black land and red land
Q. Well, the lands are pretty soft? A That depends on whether they are wet or dry. If it is dry it is pretty hard, as hard as brick
Q. You are not troubled when it does not rain, are you?
A No sir
Q Whereabouts does the fill commence, at tide water?
A It commences in the first place at tide water, and it has worked its way up the valley and the further it gets up—
Q (Int'g) What is the Spanish name for that creek?
A It has no Spanish name
Q It has no Spanish name?
A No sir.
Q What is grade of it from say tide water up to San Leandro? A Unless I am mistaken the creek has several different names

11666

The Court The Spanish name
of Walnut Creek is it not?
A That is the name of the
main creek.
2 What is the Spanish for
walnut? A. Nueces. The
Creek is marked on the map
We generally call it Walnut
Creek. Some people call it
San Ramon Creek.
Mr Cadwalader Walnut Creek
heads in Mount Diablo?
A Yes; Walnut Creek is
the main creek. Mount Dia-
blo Creek used to Empty
into that.
2 What is the grade of this
arroyo or Creek that Empties
into tide water there at
Pacheco? A From the
town of Pacheco I judge it
is 40 or 50 feet — 40 feet to
the mile
2 40 or 50 feet to the mile?
A Yes in some places and
some places less
2. And the cutting is all
done by the running water

1167

in the county?

A Yes, of course.

Q How long has it been doing this? A Well, it never affected the valley until after the flood of 1862

Q. It was done principally in 1862? A Yes.

Q Have the lands in the bank of the creek, been cultivated since 1849?

A I guess the first cultivation that was carried on there in that valley was about 1850

Q. It has been steadily cultivated ever since has it not? A Yes.

Q Growing what grain?

A Wheat principally

Q You plow down every year to the bank of the creek?

A We plow to the bank of the creek?

Q Yes? A Yes.

Q On both sides? A Yes.

Q For the 20 miles?

A We do not plow the whole

of it, no sir
2. I do not mean the whole of it but in the valley?
A Some do not plow. Some pasture the land and let it rest a year. Some let it lay and they cut hay off of it and some summer fallow the ground.
2 Pacheco must be in a valley is it not?
A Yes it is in a valley
2 A very small one?
A Yes it is about 20 miles long
2 It is not on the high land?
A What do you mean
2. The town of Pacheco?
A. That is in the main part of the valley itself
2 Where the town is situated?
A It is at the lower extremity of the valley
2 Is there anything more than a flat there where the town is?
A Yes.

Q How many acres are in that plat?
A It was on the western side of the valley next to the foot hills but of course the town, part of the town now is moved to the hills
Q What I want to get at is how large is the plat on which the town is built. That is what I want to get at
A You mean how much ground the town covers.
Q The ground where the buildings are
A I suppose that the town would take in probably —
Q (Interrupting) I do not ask you what the town would take in. I ask you what the area of the land is at the place where the buildings had to be raised
Mr Belcher I should think that would be the same thing because he said the whole town had to be raised
A All the buildings that

are on the flor had to be raised. The amount of land there is under each house I do not know.

Q It would be the sixteenth part of an acre to the house?

A It depends on the size of the house. Under some houses probably there would be and some probably not.

Q How many houses were there?

A I never counted them

Q Were there more than two acres on the flor?

A Yes.

Q Three acres?

A Yes.

Q Four acres

A There were 40 acres.

Q How much of that was filled?

A The whole of that was filled

Q The whole of it to what depth

A To a depth of from 11 to 12 feet

1691

O How many streets did you have there?
A six or seven.
O How many cross streets
A The same number.
O Make a diagram with you of that given me the names of the streets that have been filled up.
Mr Belcher We have one here already of the town.
Mr Cadwalader I beg your pardon I had not seen that
Q Is this yellow part the part that was filled?
A No sir.
O The red?
A The whole of it.
O The whole of it in this fork
A Yes, Just as you see on the map there the whole has been filled up.
O On both sides of the Creek?
A Yes on both sides of the Creek.
O How many acres are there in a block
A I do not know the size of the blocks I never took

11692

interest enough in the town to measure them.
Q Well there are 26 blocks here. You do not know the size of the lots do you?
A No sir.
Q How does that Creek run in which direction?
A It runs to the North
Q Mr Hook just come here a moment please Where is the bay (Referring to a diagram) in what direction?
A You mean what direction
Q Yes
A There is the bay in this direction (Points)
Q Is that the North (Points)
A Here is North (Pointing)
Q The bay is down here is it (Pointing)
A Yes and this is the side of that Warehouse that I spoke of (Pointing)
Q How is this connected with the Creek (Pointing)
A The town?
Q No sir the connection here

(Pointing)
A I never saw the Warehouse was Connected with the Creek.
Q Where are the hills here?
A You Could see them by looking at the other Map, Or is not on this Map.
Mr Belcher The witness has pointed out here that the part of the Colorado Yellow has been only in part filled I understood you to say that the first four blocks had been filled?
A Yes.
Q And the rest had not?
A And the rest had not
Mr Cadwalader How about the filling east of Main Street
A East?
Q Yes east of Main Street?
A This has been filled up Uniformly.
Q How much?
A About 12 feet.
Q How far back?
A How far up the Valley?
Q How far back

Mr Belcher How far east?
Mr Codwalader Yes, how far east.
A About half a mile.
Q And it strikes the hill?
A No sir.
Q Is that all marsh land?
A No sir
Q Was it all marsh land ever
A No sir it was very low land
But it was not what we term-
ed marsh land. Marsh
land is where the tide land
comes up I suppose that is
what you mean.
Q I do not mean it in that
sense but was it land that
had to be drained in order
to be Cultivated?
A Well the land was of no
value for Cultivation at all
Q It never has been?
A No it will be some day
now as long as it has
been filled up.
Mr Belcher Was it solid land.
A Yes sir solid land.
Mr Codwalader You mean now
A Yes and it always was solid

land but it was Comparatively low land what you might Call low land

Q Having no value for use?

A It was pretty good pasture land.

Q How about this land lying South of Diabalo Street?

A South of Diabalo Street.

Q yes

A It is was about the same kind - south you mean how far south -

Q Running down to 4th Street

A All that land in the immediate Vicinity Of Pacheco was about of the same quality until you got about a quarter of a mile south of the town and then of Course it was good land the finest land in the state.

Q The Creek has filled up to what point

A The Creek has filled up to a point about two Miles South of the town of Pacheco

Q Two Miles south of Pacheco

A Yes
Q How near the bay
A Well I should judge it was over six miles. That distance I have never measured exactly I could not tell.
Q Does this Dry Creek tumble down a steep ravine in to this flat?
A no sir it follows the Valley. It comes right down the Valley but it has a fall of about 30 or 40 or 50 feet to the mile
Q Have you ever measured the grade of it?
A Yes part of it
Q What part?
A The part that has been filled
Q You never estimated the grade of the other part?
A no sir.
Q Does it head in the mountain top?
A no sir.
Q What does it head in
A It heads from a small marshy swamp or a Lake, not exactly a lake.

11677

Q At what elevation above the bay?
A I could not tell you.
Q About what?
A I have never been down in that part of the country and do not know. The valley has a gradual rise to the point where the lake is. There is a stream that starts and goes in the other direction.
Q It must be about two feet high?
A No sir.
Q And it is a creek that you describe as a dry creek
A Yes part of it is dry in the summer time and part of it is deep enough so that it has running water, Spring water that is running in the summer time, especially the middle part where the creek is deep enough to break our it has an under current
Q It is what you call a dry Creek?
A Yes it is what I call a dry Creek

Q And this town was built near the head of this estuary
A Yes that is if you term it the estuary as far as the tidal water goes I suppose
Q What other Creeks empty into this Creek and into this estuary?
A Well there is what is generally known as Murder Creek
There is one called Murder Creek.
Q How long is that?
A Seven or 8 miles.
Q Where does that run. Where does that head
A That heads in the four hills in the western part of the valley.
Q In the western part of the valley?
A Yes.
Q Now Walnut Creek where does that head?
A That is the Creek we have been speaking of. That is the main Creek in question
Q That is the main Creek?
A Yes

Q To Mr Belcher you spoke about the innumerable number of other Creeks that Come into Walnut Creek

Mr Belcher He said Cuts, Not Creeks.

A They have no name. They are simply Cuts running off probably half a mile or so from the slope of the main branch

Q Does not all the drainage from Mount Diablo get into this estuary?

A Yes all the western slope of the mountain Comes into that With the exception of a very little from the Coal Mines that goes into Marsh Creek probably.

Q So you get the drainage from any of the Coal Mines?

A No sir.

Q What is the drainage area of this Creek?

A I never Computed it.

Q How high is Mount Diablo

A Something Close to 4000 feet

11680 Q Four thousand feet?

A Yes.

Q How far would it be from the lake or the swamp into which this lake heads to the Western part - the Northern part of the drainage area of Mount Diabalo?

A That part of Mount Diabalo that drains into this Creek? How far is it from this Creek.

Q Yes?

A I could not tell you?

Q Well about how far.

A I should Judge it is about 16 or 17 Miles.

Q I thought you said the Creek was 20 Miles long?

A Yes. Mount Diabalo is not the mouth of the Creek

Q I am speaking now of the Northern part of Mount Diabalo but still keeping in the water shed of this Creek how far would that be

Mr Belcher It is all designated on the Map and it is easy for you to Compute for yourself

Mr Cadwalader Where is this water Lake show it to us on the Map please

A This is the mouth of the Creek (Points) the Creek heads up in here (Points) and here is a swamp right here (Points)

Q It is 20 miles from here to here (Points)

A Yes I think so

Q How far in this direction is the water shed that sends the water down in here (Points)

A Here is the summit of Mount Diabolo (Points) You can tell by these small streams the direction of the water shed and about the distance.

Q It takes the drainage from the summit of Mount Diabolo?

A Yes

Q How far in this direction does it take the water (Indicates)

A Here is the line indicating the water shed of this Creek (Points)

Q What is the size of the water shed
A I could not tell you what it was.
Q It embraces the whole western slope of Mount Diabalo
A Not the whole of it I do not think, I do not know what you term Mount Diabalo — whether you so term the whole range of mountains
Q That embraces part of the Western and all of the Southern slope of Mount Diabalo
A No sir I do not think it does. I think the Chain of mountains run to the South. Of Course it would not take all the Southern slope.
Q Well this Map will show for its self. Mount Diabalo you say is 2000 feet high
A Somewheres in that Neighborhood
Q There are innumerable streams running down the sides of Mount Diabalo are there not?

A Yes

Q You have a very heavy rain fall on that slope

A Generally we have plenty of rain in that valley, lots of it. Generally we have pretty heavy rains, but no snow. It very seldom snows. Once and a while there is snow on top of mount Diablo.

Q There the tides ebb and flow?

A Yes that is my opinion

Q So now the tides facilitate the filling?

A It depends on whether the tides are up or down.

Q If there were no tides as it is in the Mediterranean the water would run as it were against a wall.

2. You speak of growing there of the trees. Is there been any diminution of the surface of that water shed that is perceptible about the roots of the trees?

A I do not know as there is.

2. Any lowering of the land at the base of the trees at the water shed?

A I never noticed it.

2. Do the grasses grow as usual in that water shed?

A Yes, and the birds sing as usual

2. and the same kind of shiny flowers grow? A Yes.

Redirect examination
of
Vincent Hool.

Mr Belcher Coming down to the mine when you do recollect, I want to inquire as to the Extent of cultivation of that valley? A Well, for a

number of years they only cultivated the level ground, that is what they could cultivate easily

Q About how many acres would you say?

A In the whole valley?

Q Yes? A I could not tell you how many acres there were in the valley

Q. It was only the level ground? A It was only the level ground that they farmed. Like other parts of the country generally the worked the lower land first, the easiest worked, and then they farmed the hills

Q How is it now above the town - Walnut Creek?

A The last year or two it has begun to fill that creek in to a considerable extent.

Q Is the country there used for pasturage or cultivation - the country beyond?

A It is used for cultivation

11686 Q. And is it so further up

to the summit, to the high land?. A All they can farm conveniently
Q All they can use for that?
A Yes.
Q Arroyo is it is used meaning simply a creek does it not?
A Yes, that is what I mean and nothing else.

Mr Belcher These two maps we would like to have marked as Exhibits as a portion of this testimony — I took #1 and #2
The Witness There is a map on a larger scale that I drew.
Mr Belcher These 3 maps we would like to have marked.
Mr Cadwalader In the same connection I want to introduce the report of Doctor Chipman as a part of the cross-examination of Doctor Simpson.
Mr Belcher The Reporter
11687 I suppose has taken down

What you read of it. State it that no other part will go in. If you want to put it in as a part of your question that is another thing.

Recess until 9.30 AM Tuesday January 17th/82

In the Superior Court of the State of California in and for the County of Sacramento

The People of the State of California
vs.
The Gold Run ditch and Mining Company.

Morning Session
Tuesday
January 17th 82

Transcript of Testimony
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Certified J. Davis
Official Reporter

In the Superior Court of the State of California in and for the County of Sacramento.

The People of the State of California vs The Gold Run Ditch and Mining Company

Tuesday January 17/ 1882 Morning Session.

Testimony of P.M. Randall

Mr Gibble. How long have you resided in California?

A. Since 1849.

Q. What is your occupation?

A. Civil Engineer.

Q. What experience have you had in that profession? A. I have had a large experience in Civil Engineering, embracing hydraulic, mechanical and mining engineering.

Q. Are you the author of works relating to the various branches of engineering that you have referred to? A. I am

Q. What?

A. Randalls Quartz Operator's ~~and~~ hand-book and Wheeler and Randall's quartz operator's handbook and other works on Applied Mechanics.

Q. What is debris and its equivalents and synonyms?

A. Debris in Geology signifies a broken —

Mr. Caldwalader. I object to that. It is immaterial and it has been sufficiently explained.

The Court. It will not hurt to allow the answer to come in.

A. Debris in Geology signifies the broken and detached fragments of rock, from rocks and mountains and piled up at their bases. But in California it has a wider signification as it embraces cobbles, bowlders, pebbles, rubble, detritus, silt, slack, slum, slime, slickens.

Q. In California parlance what if any is the difference between debris and detritus?

A. Debris seems to be used as a generic term embracing detritus.

11690

Q. Are you acquainted with the

Sacramento Valley?
A. I am.
2. What made them?
A. The forces of nature and the efforts of man — the operations of man and beast.
2. What is the drainage area of the Sacramento River its affluents and the bays?
A. About 55,000 miles.
2. When did you first become acquainted with this drainage area?
A. In 1849, in October, November and December.
2. When did you first visit Sacramento City?
A. About October 20th. 1849.
Mr. Cadwalader. Have you got your works with you?
A. Yes. I have not them in my hand. I have them in my valise.

Mr. Dibble. I would like to obtain permission of the Court to retire this map for a short time — the map of the Gold Run Mining District, Placer County. It will be returned to Court.

The Witness. There are two of my marks and I can get you some others that I have in my room, but those are the only ones I have here.

Mr. Dibble. What way did you come to Sacramento City?

A. I came in a ship and in a sloop.

Q. How far did you come by ship?

A. As far as Benicia.

Q. Did you have any trouble in making the trip by the ship?

A. I did.

Q. What trouble?

A. We got aground in San Pablo Bay.

Q. How long were you aground in San Pablo Bay?

A. About six hours I think it was. We went on at low tide and got off at high tide.

Q. What was the ~~draught~~ draught of the ship?

A. From 14 to 15 feet.

Q. How long did you say you remained aground?

A. Some five or six hours; the exact

time I could not recollect.
2. And ~~did you~~ after reaching Benicia what kind of craft did you come up the river to Sacramento in?
A. A sloop.
2. When you arrived in Sacramento were there any vessels there? if so how many?
A. There were some six or seven.
2. What kind of vessels.
A. They were sea-going vessels but light draught — a small class of vessels some three masts and some two.
2. Were they ships?
A. No.
2. Where did they anchor? Where did they discharge their cargoes?
A. They made fast to the bank by trees or posts in the land and discharged their cargo upon the bank of the river.
2. How long did you remain in Sacramento?
A. From 1849 to 1853.
2. What business were you engaged in?

A. I was in the lumber business and I did a little vegetable business. I sold one lot of potatoes that I had bought.

Q. What was the lumber used for?

A. For building purposes and for mining purposes.

Q. Where did you get the vegetables?

A. I bought those at Martinez. They were very small potatoes — so small that they were mistaken for pease.

Q. ~~Do you~~ During those years state to what extent farming was done on the American and Sacramento rivers?

A. There was no farming carried on at that time.

Q. How do you know there was none?

A. I saw none when I was frequently passing over the ground.

Q. What in 1849 and 1850 was the condition of the Sacramento and the American Rivers?

A. The Sacramento River was

somewhat muddy and the american was slightly discolored.
Q. Were there floods during those years?
A. There were.
Q. Describe them.
A. The flood of 1849 arose about two feet over the levee — between two and three feet over the bank of the river. It was eight feet high on "K" street opposite the Stidger Hotel — Judge Stidger's hotel. That was between Fifth and Sixth street.
Q. How do you know that the flood was that high at that time?
A. I had on the levee some lumber and I went there and piled it up to see that I could be sure and have it safe.
Q. At that time what was the population of Sacramento City?
A. I jindge about 10,000.
Q. During this flood what became of the people?
A. They went to the highlands.

1695

Some took to the upper stories of or half stories of the buildings and some took vessel for San Francisco.

2. What was the conditim of the city after the flood?

A. After this flood a filth — a slime covered it — a slimy deposit covered this city.

2. Describe it.

A. It was very filthy, slimy matter, sediment.

2. When was the next flood?

A. In 1852-3.

2. Describe it?

A. It was less. It was not as high as the one of 1850 as I recollect.

2. What was the conditim of the city after that flood?

A. Similar. It was in a ~~the~~ filthy conditim from this slimy matter deposit.

2. State the extent of those floods as to length and width of the overflow. A. They were from this point — from this standpoint they were as far as I could see. In fact

it was a sea. It was a sea of water, of fresh water.
Q. How wide.
A. As far as I could see. Probably to the foothills.
Q. When you arrived in Sacramento did you see evidence of high floods that had occurred previously?
A. Yes, I did.
Q. What evidence?
A. I saw sand deposits much higher than the floods of 1850 and 1852-3.
Q. Where were those sand deposits found?
A. At the Cemetery at this ridge at the east known as Poverty Ridge.
Q. How much higher were those old floods, the evidence of which you saw, than the floods you saw in 1849-50 and 1852-53?
A. About 20 feet I think higher than the banks of the river. Eighteen feet, was seventeen or eighteen feet higher than the flood water but about twenty

feet higher than the bank of the river.

Q. What was the width of the Sacramento River in 1849 and 1850 at Sacramento City?

A. About seven hundred feet.

Q. What was the width of the American River at Sacramento City?

A. Four hundred I think or thereabouts.

Q. Taking the grade of the Sacramento River at Sacramento what must have been the width and depth of that river to carry and discharge the flood waters that you saw in 1849 and 1850 and in 1852 and 1853?

A. A mile at least.

Q. A mile wide?

A. A mile in width and of equal depth with the river as it then had.

Q. What was the carrying capacity of the Sacramento River in 1850?

A. It was about one hundred thousand cubic feet per second.

Q. What was the actual flow at that time?

A. About 770,000. Cu ft per Sec About 776,760.

Q. How did you arrive at those amounts?

A. By the flood formula of J. T. Fanning.

Q. Is the Fanning formula accepted as a correct formula?

A. It is.

Mr. Cadwalader. I want to object to this testimony upon the ground that it has not been shown that this gentleman is a hydraulic engineer.

~~The Court~~ Mr Dibble. He has testified that he is.

The Court He has so testified.

Mr Dibble. Have you examined the widths and profiles representing the water area during the last flood of 1881 between Sacramento and Dairsville on the railroad line?

A. I have.

Q. Have you by actual surveys ascertained whether that profile is correct?

11699

A. I have. It is correct.
Q. When and how did you do it?
A. I did it by the usual means of measurement.
Q. What does that profile represent?
A. It represents a cross-section. It represents the cross-section of the country between here and Davisville.
Q. Have you that profile?
A. I have.

Mr. Dibble. We now offer the profile in evidence. We present it to the Court. It is marked "Smith Exhibit Six."
Mr. Cadwalader. We have no objection to it.
The Court. It will be received.

Mr. Dibble. Q. What does that profile represent?
A. It represents a cross-section of the water ways through the railroad, through the embankment.
Q. How many square feet of water way were there in the

11700

Sacramento River ~~particularly~~ proper, during the flood, at extreme high water in 1881 as represented in the profile?

Mr. Cadwalader. What do you mean the discharge?

A. About 20,000 feet in the river.

Mr. Cadwalader. You mean the discharge?

A. This was a cross-section of the river.

Mr. Dibble. Q. How many square feet of water way was there at the extreme height of flood in 1881 in the tules between Sacramento and Marysville?

A. 120,008.

Q. What proportion of the flood of 1881 was carried by the river proper?

Mr. Cadwalader. You say the cross-section of the Sacramento shows about 20,000 feet?

A. Yes.

Q. And the cross-section of the water way, through the railroad embankment, is 120,008 feet?

A. 120,007.75 I made it by calculation.

Mr Dibble. Answer the question I last asked you.

<The Reporter read the question>

A. About from 1/8 to 1/2.

Q. How many rivers of the size of the Sacramento river would be required to carry the water of the flood of 1881?

A. Some seven or eight rivers.

Q. By what formula have you made that calculation?

A. By the Fanning formula and by the known formula, by the accepted formula of standard engineers — standard authors on engineering.

Q. And by your own experience also?

Mr. Cadwalader. Q. Did you include Rankin?

A. Yes, I have Rankine and Weisebach.

Mr. Dibble Q. Suppose that at the flood of 1881 the high water mark in the tules west of Washington had reached the same level of the certain high water mark in the river, what gross

amount of water would then have been discharged opposite Sacramento City?
A. About twice as much.
Mr. Cadwalader. I object to that question. It contains a conjecture that is not in the case.
Mr. Dibble. That profile shows that fact.
Mr. Dibble. 2. What was the reason that the water in the tules was lower than in the river?
A. The levees in the river guided the water, and restrained it from passing off.
2. Explain more fully why the levees were the cause?
Mr Cadwalader. You say the levees restrained the water and kept it from filling the tules?
A. Yes, they did to some extent.
Mr Dibble Explain more fully why the levees were the cause?
A. They guide the water. Any one observing a stream of water flowing will perceive that it is rounded in the center. As it flows forward it seems to

draw in from the sides and it will be piled higher in the center than it is on the sides.

Q. Are those statements made with reference to the profile there.

A. Yes.

Q. Why is it that the water in times of flood remained so long in the Sacramento Valley?

A. For a lack of fall and ~~tube~~ outlet.

Q. Explain more fully what you mean with reference to the lack of fall and outlet?

A. If there was ample fall for the water to flow out and if there was an outlet to go off it would flow more rapidly off.

Q. Have you since 1853 been upon the american and its water-shed?

A. I have.

Q. When was your last reconnoissance?

A. In October, November and December I made a reconnoissance of the different portions of the river.

Q. In making the reconnoissance what route did you take?

A. I began at the bridge from

Sacramento to Yolo. I went up on the left bank of the Sacramento River and then crossed over the american River at the bridge, thence across the Twelfth Street bridge, thence by team went to Folsom touching wherever practicable, touching the river, approaching the river wherever practicable.

2. In this section what did you find?

A. The first notable change that I observed was at the mouth of the Sacramento River. It was further to the north.

2. State what change there was at the mouth. State about the change in the mouth of the american river and the effect of the change.

A. The American River formerly discharged its waters obliquely or in an acute angle with the Sacramento River, but at present it empties into the Sacramento River nearly at right angles.

11705

Q. State the effect.
A. The effect is to dam up the waters of the Sacramento or in fact that is mutual — the damming up between the American and the Sacramento rivers. The waters of the American River are thrown across the ~~the~~ Sacramento and at the rate to tear away the embankment on that side.
Q. What then after they have been projected ahead and thrown against the embankment?
A. The tendency, as I say is to tear away the embankment on the opposite side — the levees.
Q. And what then after the embankments are torn away?
A. It overflows the country back.
Q. Whatelse did you see in this section, No. One?
A. I saw large amounts of debris from the river. The banks were torn away and there were large amounts of debris from the river.

11706

Q. What with reference to the washing away of lands by the overflows?

A. I did not perceive any washing away of the land on the tour I made.

Q. Describe these bank erosions as to extent in that section?

A. They were in the vicinity of Alder Creek — there were large erosions there. The banks were torn away. The river was very wide — fully a quarter of a mile wide. The bed was filled with cobbles, sand, etc.

Q. Did you in this section see extensive excavations and evidences of mining work and if so describe them?

A. I did. I saw evidences of old mining there in the vicinity of Alder Creek and at Folsom. I saw mining going on at Folsom — ground sluicing.

Q. What became of the mining tailings?

A. They were thrown in the river or emptied in the river. Some were being run out to form lands.

Q What was the second section of your route?

A From Folsom to Placerville.

Q What was the third section of your route?

A From Placerville to Gold Run

Q. In these sections what evidence did you find of old mining?

A. I saw it. I saw the evidences of old mining along the route, old placer mining and gulch mining

Q To what extent?

A. To a large extent - river mining also.

Q. What became of the tailings of these old mines and mining operations? A Some were remaining on the ground, for instance on the shallow placer mines, some were in the gulches ravines and

so forth

Q. When you reached the Iced Run mines state whether you examined them as to the mining that had been done and the mining remaining to be done?

A Idid

Q. What had been the character of the material that had been washed away and when washed away?

A It was lighter, lighter than the material that was remaining and evidently different from the remaining material in this, that the upper material, as shown by the gravel bank seemed to be mechanically compressed together, but not cemented, while the lower portion was a tough, cemented gravel

Q What is the character

11709

of the lower material as to density and movability

A It is very heavy and would be moved with great difficulty requiring explosive agents and other means for breaking it up

Q What per cent of that dense material would be transported down the river a distance of six and a half miles?

A Ten per cent

Q What per cent would be transported thirteen miles? A One per cent.

Q What amount will reach Sacramento?

A An imperceptible quantity

Q Why no more?

A The laws of deposition prevent it

Q What is the specific gravity of material carried in suspension?

A As shown by Mr Steel

14239.67
1221

15459.67
1925.

17,384 67
18487

1,103

P. 11,789

Palmer Sheet

Dr. Balance Sheet. Cr.

		R. C. Clark - Trustee	1 to 7	5.	979	43
4.	520	00	R. C. Clark - Private a/c	21			
			Clark & Sass	31	4.	309	65
			Paul Morrill	35	1.	000	00
			D. O. Mills & Co	39	4.	868	33
3.	750	00	Bills Receivable	43			
			James Haworth	45	2.	500	00
			Wm H. Walton	47	2.	500	00
279	99		L. W. Hatch Jr	51			
21	11		John H. Sass	53			
			A. Cadwallader	55	1.	000	00
50	00		H. O. Beatty	65			
205	22		C. I. Hutchinson	69			
			Jos W. Winans	73		650	00
			Henry C. Robinson	75	1.	000	00
			E. P. Ranm	77	16.	500	00
15.	765	63	Interest	79			
15.	984	37	Expense	85 to 88			
24.	703	06	Stock	95 to 98			
6.	272	77	Crops	99 to 129			
			Watson & Bein	147		625	40
			Baker & Hamilton	151		133	00
			D. W. Earl & Co	155	1.	153	65
			Milliken Bro's	157	1.	744	73
221	53		Chas C. Greene	159			
133	00		Hutchinson & Greene	163			
			A. G. Crane	167		600	00
			Jerome C. Davis	169	3.	782	47
			Bills Payable	175	24.	574	02
$71.	924	68			$71.	924	68

the State Engineer the standard is one and four tenth. I think 1.9 might be carried in suspension with no extraordinary velocity

Q Then your judgment is that 1.9 could be carried in suspension by the current?

A yes sir

Q What is the specific gravity of the material that you found in the Red Run mines?

Mr Cadwalader What current, just state

A well say probably a 2 mile current a 2 or 3 mile current

Mr Haines Q What is the specific gravity of the material that you found in the Red Run mines?

A The original material of the upper is 2.31 and of the lower is 2.567! The original

material before treatment of the upper proportion is 2.31, the original material before treatment of the lower is 2.567

Q Will material of that specific gravity be carried in suspension?

A Not by a current of two miles an hour to any extent

Q What is the area of the bed of the American river below Folsom and of the Sacramento river and Suisun and San Pablo Bays?

A About 200 Square miles

Q It has been shown in the testimony of this case that the further working from the mines of the defendant will result in placing 600 000 cubic yards of material into the North fork of the American

river below Canon Creek
Now supposing, as an
example that every
particle of this material
was deposited from
Folsom down, how deep
a fill would it make
in the 200 square
miles?

Mr Leadwalader Object
to that as it calls for
a simple sum in arith-
metic

The Court It is a very
convenient way to get
at it probably

A It is 1/333 part of a
foot

Mr Dibble How long would
it take such mining
suppose every bit of it
came down; how long
would it take such
mining to fill up one
foot in that area of
miles?

A It would take 333
years.

Q In examining the Gold Run mine did you find mica?

A I did not.

Q. Have you examined the sands of the American rivers between Folsom and this City?

A I have

Q. What is the character of the sand?

A Micacious

Q. From what source do the micacious sands come? A In the old and recent workings in the granitic belt.

Q Did you find granitic formation in the Gold Run mine?

A I did not.

Q. Was it micacious slate that you found there? A It was not

Q In what particulars do the sands that you found in the Gold Run mine differ from the

pands that you found in the American river opposite Sacramento City?

A The Gold Run sands were barren of mica and those in the American river were heavily charged with mica

Q From what source did these sands that you found opposite Sacramento in the American river come from?

A Evidently from the granitic ~~gravel~~ belt

Q Where is the upper line of the granitic belt? A I have traced it between Auburn and Newcastle about 2 miles on this side of Auburn

Q What is the extent of the granitic belt?

A I do not know the entire extent. I have been over large portions of the tract there on

the decomposing granite formation

Q Have you studied chemistry? A I have

Q. State whether mining sediment contains the elements of disease?

A It does not

Q State whether Slickens, so called, contains elements required for vegetable production? A They do

Q What effect if any does the depositing of the dense material from the Gold Run mines have upon the Valleys of the rivers?

A They have no effect, they never reach the Valleys in appreciable quantities

Q What effect upon the navigability of the rivers?

A The same answer, imperceptible

Q Have you examined the navigable channels of the

bays? A Thave

Q When? A November 5th 6th and 7th

Q. Why did you make these examinations?

A To ascertain if any amount of debris had reached the Bay and to determine the soundings

Q In your examinations of San Pablo Bay who was with you?

A There was Mr Hamilton Smith, General Dibble Mr Burr, Col. Mendell, Col Lewis, Mr Skidmore and several other gentlemen whose names I do not now recall - Mr O'Brien and Capt. Falconbery and others

Q Did you take soundings?

A I did

Q. For what purpose?

A To ascertain if there had been any filling

Q How many soundings did you make? A 14

Q Did you compare these soundings with soundings obtained in early years?

A I did

Q With what soundings?

A Those shown on the Coast survey chart of 1862, a United States Coast Survey Chart of 1867

Q What is the result of the soundings you took compared with the United States Coast survey Chart?

A There was no observable difference

Q Besides the sounding what else did you do to ascertain the condition of the Bay channels?

A Took samples of the bottom.

Q Why did you take samples? A To ascertain if any mining matter had reached those points

Q How many samples did you take? A 14

Q. Describe the Samples?
A. They consist largely of mud impalpable to the touch
Q. What color?
A It is mud
Mr Cadwalader, Cont'g 7 Black mud? A well it was colored mud
Mr Dibble What color?
A It was a greyish colored mud or dark - dark grey
Q Describe its appearance with reference to mineral grit or mining sediment?
A No it was like soap stone to the feel
Q Stow did you ascertain that they contained no mineral grit or mining sediment? A By the sense of touch
Q Stow do you know that you were taking samples of soundings in the navigable channels of the Bay? A They

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were not all taken in the channel but some were taken from the sides of the channel and then as we would go into deeper water we could determine when we were reaching the channel. Likewise Captain Falconberg, a man familiar with that Bay gave us directions in that matter and likewise we had the Coast survey chart to refer to as we went on taking our observations from different points laid down on the chart

Q Then I understand you from the Chart and the direction of Capt Falconberg you were taking samples and soundings in the channels of the Bay?

A In the channels.

Q. How did the samples compare with the material washings around the Bay? A They were of the

same character.

Q Did you make examinations of other points and places? A I did

Q Where? A I took one sample about 300 feet off the foot of Second Street, San Francisco, the dredgings, and another at the foot of Vallejo Street the old slip - the Vallejo slip, one at the new depot at the slip of the new depot at Oakland and one off the foot of Stockton Street North Beach in line of Stockton Street San Francisco North beach off the wharf in line of Stockton Street

Mr Broadwalader Opposite Stockton Street at North Beach? Ayes sir just in a line with it — Stockton Street does not come to the wharf but these were taken about 50 feet off the wharf

in line with Stockton Street

Mr Dibble Q At other points did you make examinations?

A Napa Creek and the Sacramento run in the vicinity of Collinsville

Q State the result of these examinations as to whether the deposit contained mineral grit and mining sediment?

A Those in Napa Creek contain none, and for the most part those in the Sacramento contain none. I got one or two samples that merely had a little sand in them

Q What effect has this deposit upon the navigability of the channels and the bar of the harbor?

A None whatever or imperceptible

Mr Gadwalader. Q What deposits, mining deposits?

Mr Dibble. The deposit he has testified to ~~2~~ 1 State whether the bar of the Golden Gate is formed by river deposit or by ocean currents?

A. Ocean currents

Q You stated that you obtained fourteen samples in San Pablo Bay. Now state whether you found in the samples any material like that that you found in the American river opposite Sacramento. A I did not <referring to specimen of rock>

Q State whether you found in those samples which you found in the Bay any sands of that character. <Henley No. 7>

Ans Sir I found nothing of that character.

Q You found nothing of that kind in any of the

samples you obtained in the Bay? A No sir. This carries considerable mica and I found no mica in those that we obtained, besides those were very much finer than this sample.

Q You examined the sands in the Gold Run mines, did you find sands like the sands in that bottle?

A I did not

Q In the samples that you took did you find any samples of the character contained in this bottle marked No 1?

A With the exception of the mica that is in this — it is marked "about a quarter of a mile above Sacramento Rwis bridge, the highest point on Bar 4 feet below surface" — the sample taken at Collinsville

resembled this very much

Q. Where is Collinsville?

A It is on the Sacramento River just above its junction with the San Joaquin

Q. You say that comes from Collinsville?

A I did not say that. I found no mica in the sands at Collinsville

Mr Dibble Q Collinsville is a long way up the river from Carquinez Straits?

A yes sir

Q. State whether you found sands like the sands contained in that bottle at the Gold Run mine? A I did not. These are micacious and those are not.

Q State whether you found material like this in the various samples that you took in the Bays? (referring to Exhibits No 6.

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"sands found between the old mouth and the New Mouth of the Sacramento River"> A I found nothing in the Bay resembling this with the exception that if the mica be taken from this it would resemble the sands at Collinsville, no other place

Q State whether you found sands of the character contained in that bottle like the sands in the Gold Run mine.

A I did not. The Gold Run sand is entirely dissimilar to those

Q State whether you found material like this contained in Exhibit No 10 "taken from the American River at E. Dole's"

A In the principles that I go both from the Bays of San Francisco and

San Pablo?

A Nothing in the Bay of San Francisco or San Pablo that resembles this as this has a fine grit and those had not.

Q Did you find sands of the same character as compared with that found in that bottle in the gold Run mine?

A I did not. This is micaceous sand and those are not in the gold Run

Q In estimating the storage of the North fork of the American river can the parabola be relied upon for ascertaining the amount of deposit? A It cannot for the reason that the depth of the river cannot be determined when filled with sand without excavating to the bottom.

Q By what means only can the amount of storage be ascertained? A To ascertain the depth of the river must be done by excavation or by reliable authority those conversant with the subject

(1787)

Q. What is the effect of an Eight mile Current to the hour in moving quarry rubble stone?

Mr. Cadwalader I object to that as being too indefinite, the size of the stone must be given

The Court. I overrule the objection.

A. It will not remove a quarry rubble stone, containing a half a cubic foot contents

Mr. Dibble How do you know it will not?

A By Experience, and by the Standard authorities.

Q What authorities?

A Du Buat and Smeaton

Q Have you those authorities?

A I have

Q What is the formula as the flow of water?

A The velocity is Equal to the Square root of the product of the hydraulic mean depth and the inclination multiplies by a constant whose value is dependant upon the hydraulic mean depth.

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2. Is it a fact as stated in this case that the velocity of the stream varies as the square root of its depth?

A It is not correct

2 Why not? A. Because it is, as the square root of the hydraulic mean depth. The hydraulic mean depth and the depth are essentially different

2 What do yu mean by the depth of a stream, and by the hydraulic mean depth?

A I mean by the depth of the stream the depth from the surface, the distance from the surface of the water to the bottom. And by the hydraulic mean depth I mean, the cross section divided by the wet perimeter

2. Illustrate by Examples?

A Suppose we have a flume say four feet wide and two feet deep. Then the cross section of that flume is Eight square feet, the wet perimeter is Eight feet, that is 2 feet deep on

one side and 4 feet wide
would be 6, and 2 feet on the
opposite side would make 8 feet.
Now 8 Square feet divided by 8
feet gives us one foot. One
foot is the hydraulic mean
depth. Again suppose we had
another flume that is 3 feet
wide and 3 feet deep. Then
3 times 3 are 9, is the cross
section: and the wet perimeter
is 3 in depth, 3 in width, and
3 in height would make 9. Nine
is contained in 9, once and
therefore the hydraulic mean
depth is one, the same as in
the other case, yet in one
case the depth is 2, and in
the other case it is 3, and there-
fore it would be incorrect to
say, the square root of the
depth. The same rule would
not apply to both these cases,
it would be Entirely fallacious

2. Is the transporting power of a current, practically – the sixth power of the velocity.

A No sir, it is not

2. Has been stated in this case.

A No sir.

2 Why not – illustrate.

A In asserting the sixth power only impact is involved in the solution of the problem, it is but a partial solution of it or it is but a part of the solution of the entire problem. Friction is to be considered as well as impact, and not only friction but the intensity of pressure – gravity. Thus we will demonstrate the problem involving only impact. Thus let us take a cube whose side is x. x^3 denotes the solid contents. The face presented to the water we will say is x^2. Now x^2 multiplied by v^2 divided by 2 g. gives us the moving power and here is the force of the weight to be moved, therefore we have this Equation;

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$\frac{v^2}{2g} x^2 = x^3$. Dividing through by x^2 we have $x = \frac{v^2}{2g}$. Now we have arrived at the side of the cube. Now this Equation, Cubed, comes $x^3 = \frac{v^6}{(2g)^3}$ raised to the third power. Now where we go through with another cube say x, or take y, if it be more convenient to put it down - take another cube whose side is y, then we would arrive at the same way with different letters. We would have $y^3 = \frac{v_1^6}{(2g)^3}$. Now taking these two Equations and making a proportion of the two, we would have. $x^3 : y^3 :: v^6 : v_1^6$. Hence we have the formula which is laid down, merely a theory for illustration for the School room, not for practice in the field.

2 Is that the accepted formula?

A Yes sir. Now I wish to say here that when friction is taken into account, and intensity of pressure, that power becomes, instead of being six, is far less than six in practice

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Q What do you mean by the 6th power?

A I mean a number employed six times as a factor in multiplication

Q Upon what authority do you say that the transporting power of water is not practically of sixth power velocity?

Mr Leadwalader. You can give an example of the sixth power if you like?

Ayes. if you wish

Q. I mean right now.

Mr Dibble No. I will go on with my examination and turn the witness over to you in due season when I am perfectly willing he should give you information upon any subject which you do not at the present time possess

A On that of the experiments of Dubuat and Smeaton and my

our experience.

Q. It has been stated in this case that a 5 inch nozzle with 300 feet pressure will discharge 1100 inches of water, miners measurement: Is such the fact?

A It is not.

Q. What amount can be discharged through such a nozzle and under such pressure?

A About 719 miners inches under a six inch pressure providing in the supply pipe that the friction was omitted

Q. How much?

A 719 inches under six inch pressure

Q Provided what?

A Providing the friction through the supply pipe is omitted

Q What amount would be discharged through a five inch nozzle with

300 feet pressure, with friction?

Mr Leadwalader. Do you mean a 5 or 6 inch nozzle

Mr Dibble You have heard the question stated twice. A 115 feet of the head is consumed by friction of the water passing through the pipe a mile in length and the balance of the head would discharge 520 miners inches under a six inch pressure.

Q. Upon what authority do you base these statements? A Upon experience and upon the authority of Fanning and of other authorities on hydraulic Engineering

Q. With Respect to the transporting power of the current of water what law is established in practice by the experiments

of Dubuat? Du Buat

A The transporting power is as 3 3/4 power of the velocity

Q. Referring again to the American river above Rice's bridge, state to what extent has the material from the Gold Run mines been impacted?

A They were cemented above Rice's bridge and I examined them at Warners — Warner's bridge. I forget the name of the bridge there but Warner lived there

Mr Woodwalader Q You say they were cemented at Rice's bridge?

A At Warner's bridge. I found them there so hard that we could walk and even the horses feet would pass without indenting.

Mr Dibble Q. To what extent

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were they impacted?

A Extent? I do not know that I understand you

Q. With reference to being moved. Were they firmly fixed then?

A Oh I have answered that — that they were firmly fixed. They were firmly held in position by this cementing property

Q Suppose this impacted and cemented material was deposited on dry land what would be the effect? Would it recement itself?

A It would not

Q Why not?

A Because it would air-slake

Q. It would not then recement itself?

A It would not

Q How is gold won from its bed?

A Largely, mostly in

fact by the use of water
Q What do you call the method of winning it?
A. Mostly hydraulicking
Q Stus such been the method of winning it in California and in the World? A Yes.
Q. Can the gold in the Gold Run mines be won in any other manner? A It cannot
Q. Stow long has the method of mining as you found it in the Gold Run mines been in practice?
A Time immemorial

Cross Examination
of
P. M. Randall

By Mr Cadwalader Q. I see that you are the Author of a Quartz Operators Hand Book
A Yes
1738 Q That was issued in 65?

A I think it was
Q And another edition issued in 77
A In 77
Q These are the same books are they not
A No there is a change of Course. One is the second Editin
Q One is the revised editin
A Yes.
Q The relate exclusively to Quartz do they not?
A Mostly to quartz. Both quartz and Silver. Quartz and Silver are there treated and Copper.
Q Of what other books are you the Author?
A I have written several Works. They were sent out as Circulars by various foundrys of Sanfrancisco: Booth and Company, The Miners Foundry, The Golden Gate and Etna Iron Works
Q Never mind the Names of the foundries. I want

the books?
A Well I have one in my pocket which speaks of hydraulic engineering. And there is another one which I have not here; there is still another one which I have down at the room (Hands Counsel the book referred to)
Q This is a business Circular of the Golden State Iron works — Miners Iron Works — is it not?
A Yes.
Q This relates to Iron Machinery does it not
A Iron, the flow of water through pipes, the flow of water through Canals, and the flow of water in Rivers; in fact Vade Mecum of hydraulic Engineering
Q What is your business
A Civil Engineer
Q Where do you reside?
A Sanfrancisco.
Q At What place in Sanfrancisco?

1740

A I room at the Hotel.
Q I did not ask you where you roomed, Where is your place of business?
A At present it is at 320 Sansome Street.
Q Where is that?
A That is the Head Quarters of the Miners Association.
Q The hydraulic miners association?
A The association of which Hamilton Smith is president.
Q Has that been your only place of business for three or four years?
A No.
Q Where else?
A When I go to the field of Course my home is there.
Q You are the paid agent are you of the Miners Hydraulic Association?
A I am in there employ and paid for it.
Q When you issued this Circular for the Miners formerly

In Sanfrancisco what was your business then?

A Writing that work.

Q What?

A Writing that work?

Q So you write advertisements for all kinds of mechanical arts?

A I cannot say that I do. For instance, not of watch making - watches or clocks or anything of that kind - I do not think that is treated of there.

Q Before you went into the employ of the miners hydraulic association where was your office or principal place of business

A My office then I made at the Library at the Capitol - at the Mechanics Library, so that I might have opportunities of reference.

Q You have not had any office of your own?

A Yes.

Q For a number of years have you?
A Yes. My office in another branch of business is on Market Street 414 Market Street.
Q What is the other branch of business?
A That pertains to the hydraulic Company in which I am engaged.
Q What?
A I say I am engaged in a company for bringing water to a certain point in the mountains: Engaged in that as my regular business.
Q From what point?
A Are you not rather too inquisitive asking me about my own private business.
Q I do not want to be?
A If you are very anxious to know about it I will tell you. It is to bring water from the Feather River to Oroville
Q It is an Enterprise which

has not got on its feet yet I suppose. You treat it so tenderly?

A It has not been fully started but it is to very shortly.

Q It is to supply Oroville with water is it?

A no. To come as far as Oroville.

Q That is a Bubble Company is it not?

Mr Dibble I object to that as impertinent and unasked for

Witness Oh let it go. Oh Bubble on? I dont object to it

Mr Wadewalade. How long have you been in San Francisco?

A I came there from the East in 1874

Q You have been there ever since have you?

A no I have made my headquarters there

Q You have been there

since 1874?

Ayes, a portion of the time. Some portion of the time I have been working in the gravel mines

Q How long were you in the East? A. Six years; I was in New York, and I spent a year in Aruba Island

Q Where is that?

A It is in the Caribbean sea about 14 miles from Venezuela, say 600 miles South of Cuba

Q Where were you before 1868? A I was in San Francisco

Q For how many years?

A Well I would have to go back. In 1860 I went down from the mines — Yes I was engaged in quartz mining and went down in 1860 to San Francisco and remained there in

San Francisco until 1868

Q Where were you from 1849 until 1860?

A From 1849 to 1860? I made a survey in 1849 and then came to Sacramento and went into the lumber business

Q Made a survey where?

A In Suisun ~~Bay~~ Valley.

Q What survey was it?

A It was for a man by the name of Cooper

Q The Cooper ranch?

A I do not know what it was called. Probably it was. I know the survey was made for Cooper.

Q What kind of survey was it? A Instrumental

Q A survey of a ranch was it? A I surveyed a tract of land. You can call it a ranch if you please

Q What did you do in 1850?

A I was engaged in the lumber business here.

Q In Sacramento? A Yes.
Q And in 1851? A In the lumber business; in 1852 the lumber business; in 1853 the lumber business
Q Where? A I commenced at the bank of the river between J and K and was there until the Spring of 1850. I then opened a yard on front street between K and O. The firm name was Keeney & Randall

Q Where were you in 1851?
A In 1851 I was at the same place

Q Selling lumber?
A Yes, the firm name then was Randall & Peckham

Q Where were you in 1852?
A At that same place

Q Selling lumber?
A Selling lumber
Q And in 1853? A In 1853 I moved on the corner of K and Front. Q And in 1854? A In 1853-4 the last of '53 I was in San Francisco
Q What did you do there? A Lumber business.

1747

2. When were you in the vegetable business as you states?
A That was my initial
2. In Sacramento?
A Yes in Sacramento. I bought a boat load of potatoes
2. In 1853 and 1854 you saw the lumber business in San Francisco?
A Yes.
2 In 1855? A In 1855 I was carrying on the lumber business, and likewise the quartz mining business in Amador County.
2 You carried on the lumber business in Amador County?
A No. I carried on the lumber business which I has established in San Francisco. And then I engaged in the quartz business in Amador County, in addition thereto
2 You still retained your residence in San Francisco did you?
A. I did until 1856 when I moved to Amador

2. What place in Amador did you go to?
A Amador village
2 Called Amador City, is it not?
A It may be now
2 How long did you stay there in the quartz business?
A Lived there until 1860,
2 In the quartz business?
A In the quartz business. Well I made surveys of mines too while I was there
2 What mines were you connected with in Amador City?
A. With the Spring Hill, the Keystone, and the Maxon & Randall - 3 quartz mines.
2 What was your employment?
A. I was President of the Company.
2 Which company?
A Of the Spring Hill. I was a director in the Keystone and a partner in the Maxon & Randall. Maxon was present at the Maxon & Randall most of the time I remained at Spring Hill most of the time

Q When did you become a hydraulic engineering?

A Well, I studied Engineering before I came to the country, taught it; taught the principles of Mechanics, Chemistry, Engineering, algebra, Geology, Calculus et-cetera

Q And every thing else, ad infinitessimo?

A Ad infinitessimo - yes.

Q Where did you teach?

A I was principal of the Academy at Westerly Rhode Island for 4 years, preparing young men for College.

Q And that is where you got all your information on all these subjects? A No. I got my information largely from reading and conversing with intelligent gentlemen.

Q But the technical part of your education you obtained at this place in Rhode Island, did you? A No. I am getting it all the time as I

1900

go along. I have always been a student

2. But I am speaking of the technical part?

A Well, I mean to technical part too

2 Your practice is of this nature. You came to California and like every body else went into a different kind of business did you not, that what you has been brought up to?

A No, not in this respect: I merely put in practice what I had formerly learned

2 You were in lumber in 1857? A Yes. I think I followed it up to about 1857 when I closed it out

2 For the last 8 or 10 years you have had no pentential employment have you?

A I have been surveying and engineering

2 and odds and ends?

A I do not know what you call odds and ends

2 You never kept a regular

office? A When I go
out the field of course my
headquarters is in the field
2 Now you came up here in
October, did you not?
A Yes, 1849
2 What time did you arrive
at Sacramento?
A I arrived at Sacramento
about October 20th 1849
2 I am not speaking of that,
I am speaking of when you
came here this year to make
these surveys for the Hydrau-
lic Miners Association
Mr Dibble I dislike that
statement made in that form.
It is not the Hydraulic
Miners Association. It is the
Miners Association
Mr Cadwalader That is what
you call it, but we know what
it is very well
Mr. Dibble Quartz miners, Pla-
cer miners, draft miners, all
miners are in it
Witness Mr Smith, the Pres-
ident of the Miners Association

On the 5th October engaged me in the matter of making the Surveys.

Q Do do what?

A To make a reconnoissance and make a report

Q You came on the 6th of November did you to Sacramento?

A Yes, came up on the 6th; was engaged on the 5th and came up on the 6th

Q And on the 7th you took a wagon and left for Folsom did you?

A Yes. I think it was the 7th I went up

Q Left pretty early in the morning, did you not?

A Yes, not directly for Folsom. We went down to the river, and up on the opposite of the river

Q You are arrived in Folsom that Evening did you not?

A Yes.

Q The next evening you were Placerville? A No, not the next Evening. The next day we came back to Alder Creek

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Q To Where? A Alder Creek. I think it was the day after that

Q What route did you take between Folsom and Placerville?

A We took a private Conveyance

Q Took the Stage road did you not?

A. That I could not say

Q How long were you travelling between Folsom & Placerville?

A We went up in one day

Q What part of one day?

A We left in the morning and arrived in the Evening

Q And then the next day you crossed over to Gold Run?

A No. the next day we made a reconnoissance of the Country about Placerville

Q What do mean by a reconnoissance of the Country about Placerville?

A Well we made Examinations

Q I know, but of what Country

A Of the whole country. We went up to the quartz mines and went to the placer mines, and went to those mills: The Benfeldt

11754

and the Hutchinson

2 You did not get 5 miles from Placerville did you?

A Not over that I think

2 You went up to Placer mine, did you not?

A No.

2 Had the El Dorado Deep Gravel?

A No, I did not go there

2 The Excelsior sometimes called

A I do not know. I did not Examine that

2 Well then you came back to Placerville and stayed there all night did you not?

A Yes

Q. Placerville is an interior town is it? A. I call it so
Q It is 10 or 12 miles -
A (Int'g) It is not on the sea shore, it is not on a bay
Q It is ten or twelve miles from the river?
A The exact distance I do not know to the river.
Q Did you cross next day to Ford Run? A. I will have to refer to my notes to get the exact dates. I can not recollect the exact dates, I will have to refer to my notes
Q. How long did it take you to go from Placerville to Ford Run. Just give me about the time?
A I have it here, I have every thing down here. I can give you all the particulars but I can not carry the dates you know in my head. I was in Placerville October 10th. October 11th I was in Placerville. I left Placerville October 12th
Q What time did you reach

11706

Gold Run? A I did not go direct to Gold Run. We went to Georgetown

Q Where did you go from Georgetown? A To Forest Hill

Q Where did you go from Forest Hill? A Michigan Bluffs.

Q From there where?

A Iowa Hill

Q Then where? A To Gold Run

Q What is the distance from Placerville to Gold Run?

A I do not recollect those distances

Q It is about 30 miles, is it not? A It may be, I did not measure the distance It is an easy matter to measure it on the map.

Q You went right across the Country did you? A Yes

Q How long were you in making that trip?

A To arrive at the Gold Run?

Q Yes? A I was in Gold Run on October 19th

Q You left Placerville what time? A. I left there

11757

I think —

The Court. The 12th he said

A I do not carry the dates in my mind

Mr. Cadwalader What do you mean by Ford Run, the Ford Run mine or the town of Ford Run?

A The Ford Run mine

Q Howlong were you in the Ford Run mine, the pit of the Ford Run mine?

A I spent part of the day there. I rode down in the morning with Mr. Jones & Skidmore and remained there, to give us just time Enough to get back at night

Q. What time did you get into the pit, and about what time did you leave?

A I suppose we were in the pit from 2 to 3 hours, 3 to 4 hours.

Q Were you there half an hour?

A Yes, fully that —

Q Who was with you?

A Mr Jones and Mr. Skidmore

Q Mr. Skidmore? A Yes

Q. The Secretary of the Miners Association.

A. The Secretary, yes.

Q. Did he accompany you on your trip — was Skidmore with you. A. From Folsom yes. He accompanied me all the way through from Folsom

Q. And with Mr Jones you went down into that pit.

A. Yes.

Q. And you think you stayed there 2 or 3 hours.

A. I think as much as that — it might have been four. It might not have been over 2 1/2. I did not note the time I merely stayed until we concluded to get back to town and not be out after dark. We made measurements across the stream as we had done before — I do not think we took the gauge there.

Q. When you got out of the pit did you go then back to Coco Run?

a Went back to Goose Run yes

2 By the same route that you took?

a No not the same route.

2 By the same route that you came out?

a I do not know. Yes, it was very nearly the same

2 Very nearly the same?

a But I think we took a different route from the one we went down.

2 Well, you saw the bank by looking at it, did you?

a yes

2 You never see the whole of the bank, never you?

a I do not know that I say it all

2 How? a I do not know that I saw it all.

2 You know what blue gravel is?

a I know what is called blue gravel, that is I saw it there is that mine.

2 Who told you it was blue gravel? a Well, I do

know that any one told me that it was. I heard it called so.

Q You heard it called so?

A Yes, I heard it called so

Q You did not think it was blue gravel. It did not look like blue gravel to you?

A. I took it for granted that it was blue gravel, because it was called so and then I was familiar with other mines that has similar character of rock that was called blue gravel, so that I did not even ask anybody whether that was blue gravel or not

Q What do you say about this material in Box Number 3 as to its being blue gravel?

A No, I should not take that to be blue gravel

Q You would not take that to be blue gravel?

A No sir

Q What do you say about that in Box Number 2?

A. That agrees more like it. But that seems to have been an isolated to some extent.

Q You feel quite confident that you will not find anything like that in bar number three in the Good Run?

A I do not say so. I say the upper gravel may have been like that. Some of it.

Q It is pretty hard to look up 100 feet is it not?

A no sir. I have looked up 5000 feet and it has not hurt my Eyes at all

Q Well now what would you say about seeing any of the material in bar number three there during that examination?

A I think very likely I saw it. I know there was light Colored Material there and I would not dare to but that is some of it though I could not swear that

761/2

Such was the fact.
Q What would be the
operation of a two mile
Current on that material?
A Well I should think it
would move some Considera-
ble portion of it.
Q Is there any part of it
that it would not move?
A A two mile Current?
Du Bust Q Yes. According to Dubuats
tables?
A I do not know. Yes I
think that would impede
it so that it would not
all move. You must recollect
the Circumstances under which
Du Bust Dubuat made his Experiments.
They were on a smooth surface
Q Never mind the Circumstan-
ces. Suppose we take his tables
as we are compelled to read
them. State whether a two
Mile Current would not move
that?
A It would on smooth boards
Du Bust such as Dubuat used.
1962 Q What do you say about

Smooth bed rock?
A If it was very smooth. polished, it would move it. But as we find it in practice I think it would move it but a very short distance.
Q What do you say about a graded Cobble bed — as you Called it impacted and Cemented, or as Mr Dibble Calls it Impacted?
A I Called it Cemented
Q What do you say about a two Knot Moving that
A I say that on a smooth bed — it might move it but not to any extent.

Du Buat
Q Do you recollect what Materials according to Dubuat a two Mile Current will move?
A No. It is not two Miles. It is 2.26 he says. Dubuat says this;
Du Buat
"
Dubuat says that a Mile and a third Velocity per hour will move pebbles an
1763

inch pr diametre.
Q An inch in diametre
A yes.

Q A mile and a third?
A a mile and a third.
And I think he says
a velocity of 2.26 miles
per hour will move
Cobbles as large as an
Egg.
Q As large as an Egg?
A yes I suppose he
means a Hens Egg. Pebbles
as large as a hens egg.
I suppose he means a
hens Egg

Q You do not begin to
see anything of an Egg
Size in that box Number
three?
A Nor of a hens Egg no
sir.

Q Now look at box number two and tell us what current would move that according to Dubuat tables

A I say on a smooth board And in an experiment on a smooth board. I do not think that a two mile current would move any of that material that I saw in the claim if it was thrown in the River with sand and have a chance to became impacted

Q Suppose it was on smooth bed rock, polished by the operation of water?

A Then I think it would move it

Q How much less than a two mile current on a smooth bed rock would move that stuff in box number two?

A Well I presume a mile and a third current would move it. I do not see anything over an inch there

Q I want you to be accurate if you please and tell me

1765

the Current of water that will move the Materials in box number two?

A That is this box (Pointing)

Q Yes box number two?

A Well on a smooth surface Understand this I say that on a smooth surface—

Q But I am asking you—

A (Interrupting) I will not be misunderstood. I will not be misunderstood. I will not be misrepresented

Q We will have no difficulty about that. I understand you to say that Subato tables were made up on a smooth surface. How fast would that water move on a smooth floor — a board floor?

A I say that those differences I did not compute but I think that even a less than a two Knot Current will move it.

Q Will move the largest Material you see here?

A Yes of these that are here

On the surface but I say when this is thrown in the bed of the River and there has a chance to settle together and be compact I say then it would so bind itself together that it would not be moved.

Q So you know whether La Conte has adopted Dubuats tables for the movement of solid matter by currents of water?

A I do not. I know if he goes by the sixth power that he has not adopted them because they are entirely in conflict with the experiment.

Q I am not talking about the sixth power at all. I ask you whether Le Conte in his Geology has not adopted the Dubuat tables concerning the transporting power of a stream?

A As I have not consulted Le Conte on that subject I do not know what he

11767

does say.
Q Is not that subject
treated in all Geologies?
A No sir.
Q It is not?
A no sir.
Q Nor the subject of the
transporting power of water?
A no sir, I have Lyells
Elements and Principles in
Geology, I have Hitchcock
I have read other works
and I did not find it.
Q It is enough to say that
it is not treated of in any
Geology you know of
A I understand it is in
Le Conte - of Course I under-
stand that Leconte has -
Q (Interrupting) What do
you say as to Dana
A I do not recollect to
have seen it in Dana
Q Could any geology be
written without treating on
that subject?
A Yes. p
1768 Q Primarily?

A Yes because it has been done. Professor Hitchcock does not do it. Lyell does not do it to my recollection. I have read him very carefully and I am certain I have never seen it.

Q This is more of a digression than anything else, The book will speak for its self. Take that material in that blue cement there. Material Number One and estimate the size of the boulders in it, I do not know whether that belongs to this mass of cement or not (Pointing to a Cobble)

The Court It was brought in at the same time and it was stated that it did not belong to the mass but it came from the mine

Mr Cadwalader Estimate the size of the solid material with a view of stating what currents would move the heaviest material there. State in the first place

1769

what you found to be the size of the Cobbles?
A Well there is one here—
Q That does not belong to it I am not asking about that but you have the Cemented mass before you?
A What proportion would be moved.?
Q No. What will the stones average?
A I suppose they will average three inches in diametre
Q Three inches in deametre
A Yes
Q What Current is requisite to transport that material that is those stones three inches in diametre
A Without going into an accurate Calculation I would say probably a four mile Current. I would make the Calculation were it not for Consuming time. It is a matter of simplicity.
Q You must always have a smooth floor or a bed

Rock as smooth as a floor?
A How?
Q State under what conditions a four mile current will move that which you see in that matter?
A Under Dubuats Conditions?
Q Under Le Contes?
A Le Conte moved make a very light stream move those.
Q Do you know anything about Le Contes Conditions or his formula?
A I demonstrated it here a few moments ago.
Q How
A I have demonstrated it here in my direct testimony. I gave the demonstration
Q So you know Le Contes tables for the transporting of matter by currents of water. You know what they are. Have you ever read them?
A I have not
Q You do not know anything about them then do you

A I do not. I know simply
the Principal Enunciated
Q So you know that he
treats on that subject at all
A I know that it is said so
Q By whom
A I have heard several men-
tion the fact. In fact I
have heard Gen Cadwalader
I think.
Q So you know that it is
treated of in any Geological
work?
A Not of my own knowledge
that I have seen
Q Well now what did you
see in the bank there at
Gold Run?
A Well I saw material re-
sembling that number one
and I saw material above
say 150 feet above or 100
feet above perhaps resem-
bling that — near the surface
of the earth, number three
Q How deep did you find
that blue Cement, number one
A How deep?

Q Yes
A I think there is probably
100 and may be more over
it — about 100 feet above it
Probably the bank rises 100
feet above that blue.
Q That is you found 100
feet of the unwashed bank?
A I did not measure it.
Q Above the blue Cement?
A Yes
Q I guess that is right.
How deep did you find the
blue Cement?
A I think that was about
40 feet deep. May be more.

Q What is the Cementing Ma-
terial in that blue?
A I think it is Iron and
Lime and probably some
Clay in it or Alumina

Q. What proportion of sand - there is some sand in here likewise? A It makes a body of it

Q. What proportion of sand and clay and solid rock would you find in these two boxes two and three? A. What proportion of sand and clay

Q. As compared with the solid rock? A. You mean here these samples - I see but very little solid rock here

Q. How is this? (Exhibit 2)

A. That contains more of the solid

Q. What proportion of this solid rock does this blue cement No 1 contain? A. Well we take regular balls and pile them together, so as to occupy the least space we can in piling together and the interstices represent about one fourth of the whole space

A. That is where they touch on the foresides?

1774 A Where they touch on the

four
twelve sides – They touch on twelve side when piled together
Q. Now is it not true that if is only as sixty six is to thirty four?
A. The exact number is one hundred divided by 408, but in practice we will say 1/4.
Q. That is where it has actual contact on each side
A. Yes sir. Now assuming that fact I would say that about 1/3 of this was fine cement and smaller gravel – Here is a lot of it here about the size of peas and hickory nuts and so forth I would say about 2/3 of that was of the cobble character.
Q. And the other?
A. The other made up of this fine sand, cement, pebbles, and I suppose to sift that out it would be probably about 75 or 80 per cent.
Q. You have already told us that a four knot current would

1775

carry the boulders in No 1.
What kind of current will
carry the remainder of the
material? A. Well
understand we are on theory
on this question, that is as
an experiment on a smooth
board - Well I suppose that
a mile current under these
conditions would carry it
Q. Now go one moment by
the tables regulating the
transportation of solids, for
instance a two knot cur-
rent will move a stone
an inch in diameter what
size stone will a four knot
current move - or a four
mile current? Q. Well
as to that I will have to
use logarithms for that
Q. I will put it so that
it will save you some
trouble would not a
four knot current carry a
stone sixty four times as large
A No sir that is not true
in fact I will simply say

1776

this that the fourth power is too great and the third power too small but that 3 3/4 power fills the conditions of practice ~~about~~ Q. I will ask you whether that is not acknowledged to be true in every work
A. No Sir It cannot be so it is not true in practice I would not care if it was Lacoste or whoever it might be, I care not if it Leconte who says it, I say he tells an untruth if he says that ~~as~~ the six knot formula is correct in practice. It is not so shown in the experiments and it is not true. Leconte has evidently done the same thing that I did in my direct testimony, that was that in part was above would require the sixth power, but that in practice emeaton has shown that an eight knot current will not move a quarry rubble stone

1777

containing ½ a cubic foot.
Now let us present this equally
Du Buat take the statement Du Buat
stating that one and one third
knot current will move a pebble
one inch in diameter. Now
take an eight knot current
which emeaton tells us will
not move a quarry pebble
stone containing a half a
cubic foot. Now 1⅓ is con-
tained in 8 six times. Six
raised to the Sixth power is
46656 cubic inches, equal to
a cubic yard, therefore if
Lecount — if that is the gentle-
men you wish to refer to
tells you that the ~~six~~ eight
eight Knot current will
move a cubic yard and
Smeaton finds by experiment
that ~~six~~ eight Knot current
will not move quarry
pebble stone containing a
½ cubic foot, who are
we to follow?
Q. What do you call half
a cubic foot? A 864 cubic

inches. You Know a cubic foot is 1728 Cubic inches and the half of a cubic foot comes be half of that which is 864

2. Have you any further instruction? A If you wish I will entertain you as long as I can.

2 Now you have made a speech. I want to do a little talking; what kind of stone, that is water worn stone comes an 8 Knot current move on a 40 foot grade?

A a forty foot grade to the mile?

2 Yes sir — Suppose it were graded so evenly that a rail road could be laid upon the surface of it, without any cutting or filling. I want to get the kind of stone that an 8 Knot current would transport under those circumstances? A An 8 Knot current would move according to Du Boat, according to the law —

Q Dam talking about according to any law.

A. It owed move a quarry rubble stone containing 828 cubic inches on a level

Q What owed be the size of the stone?

A Oh, it owed be half a cubic foot. Take a whole cubic foot and break it in two midway and you have the size of half of one cubic foot — You want to know one side of it

Q You have allowed the other side to get you into some misleading question. Now we have got no conditions here concerning the transportation of rubble stone, irregular in its form, but we are dealing with water room stone and I do not care anything about your quarry rubble. I want to know now, where it is given to you, the grade of a river of 4 feet to the mile, and its grade is so even that a

11700

railroad ought be laid down as it without any cutting or filling, what kind of cobble stone would an 8 knot current move in those particular conditions?

A Well, without going into it deeply, because that comes as a question in mechanics simply, I will say that we find now that a current of 8 miles, will move say 828 cubic inches. Well, it would carry one containing say probably 1200 cubic inches, 1236-

Q Well, what would be the size of that; say when reduced - not to the square, but reduced to the form of an egg?

A It varies as a little less than 11 inches

2 A little less than 11 inches Each way?

A Yes sir

2 That would be piled upon?

A On that grade and on a smooth bottom

2 When I speak of knots I mean miles

A I understand sir

Q. You understand it to be the same? A Yes sir, that is —

Q <Intj> Now suppose you double that grade?

A <Intj> A knot proper is a sea mile. A statute mile is different

Q I am speaking now of miles, 5280 feet.?

A 5280 feet, that is a statute mile. 6076 1/2 is a knot

Q. I want to know whether you answer is given in reference to statute miles?

A By the statute mile, 5280 feet.

Q Now suppose you double that current so you make it 16 miles an hour? What kind of material?

A That was in 8 miles

Q Now you double your current?

A All you do is ~~two~~ to raise it to the 3 ~~2~~ 3/4 power — 16 would be too large — it would probably

782

Carry one about 12 times as Large.

Q Well what dimension would that be? A It would be about 12 times, it would be a trifle over 20 inches Each way, a 20 inch Cube.

Q Is that according to Le Conte tables?

A. I tell you that I cannot state accurately unless I used use logarithms

Q Dont Le Conte say that such a current will move stones 20 times as Large?

A As I told you, I have not seen Le Conte's statement on that subject, I can not tell you what he does say, I do not know I am sure.

Q You said that Le Conte on that subject did not follow DuBoat? A I say that he does not follow DuBoat, if he takes the sixth power. If he takes the sixth power it would take a stone as Large as this room

11783

2. You say you do not know what Le Conte says, that the sixth power is correct?

Mr Dibble The witness has already said several times that he has not examined Le Conte on that matter.

Mr Cadwalader Not on the subject of the sixth power.

A I say this, that if Le Conte says so, he says that which is not true in fact, in practice, if he says so

Q What enables you to fly in the face of such an authority? A Because I have better

Mr Dibble In the first place Le Conte did not say so and in the second place, he is not seeking to fly in the face of that authority.

Mr Cadwalader I will show you the book if you will give me a decent show.

Mr Dibble I am pleased to have you read it

Mr Cadwalader Where did

1784

you conduct any series of
experiments that would enable
you to contradict so eminent
a geologist as Professor Le
Conte

Mr. Dibble I object to that,
because he is not purporting
to contradict him.

A I am not contradicting
him. I say, if he said that

2 Where did you conduct
your series of experiments?

A By observations in; and
by close study of the author-
ities

2 Where, what observations?

A I have seen it a streams,
I have seen it in rivers and
I have seen it from my child-
hood, all the way along, I
have seen sand in the bottom
of streams where there is at
least an 8 knot current
moving and the sands were
there

2. You have seen it with your
eyes?

A Yes

2. You have never had

1785

any instruments have yu.
A No, I did not fasten any instruments to the weeks under the water & see how much they avowed so

2. Yu. have never had any hydrographic instruments have yu?
A Well, I have never used anything to determine that

2. Never used any thing of that kind?
A Not in that way
2. But have yu handled any of the instruments that are familiar to hydrography?
A I understand the use of them
2 Well, but have yu ever used them, yu say yu have not got them, have yu ever used them?
A I have used some.
2. Well, what ones?
A A rod to determine the depth of the water

11786

2 What kind of a rod?
A. A graduated rod
2. Such as a Land Surveyor uses?
A Yes sir. 2 That is all?
A No, I do not know that that is all
2 Do you know what the Cables know of the movement of sharp edged stones, as compared with water worn stones such as cobbles.— You know the difference in resistance that one offers to the water when compared with the other?
A No, I do not know what the tables say in reference to that

2. There is a great deal of difference in there not?
A I do not know that there are any tables prepared for that
2. Well which moves with the greatest facility, under the same conditions, the cobble or nubble?
A Well, I think the cobble would move more readily on a smooth surface

11787

Q Well, take a River bed, Say, such as you found between Rices bridge and Warners bridge A I think that Cobble would probably move more readily. Q Well what is the difference in favor of Cobble?
A Well there might be ten per cent in favor of Cobble.
Q Has the quantity of water anything to do with the Current of the stream; or does the Current of the stream proceed entirely from the grade and the obstructions?
A I understand that as we look at it, a stream, there is what we call an unlimited stream; that is, it is not influenced by the sides of the bank or anything like that.
Q I am not talking about that. Does the Velocity of a stream depend on its grade or are there other Conditions
A It depends on its grade, on its depth and on its width; because there must

1788

be width enough so that
the sides shall not influence
Q Does the Volum of water
Control its Velocity
A No. Because it might have
great width or but little
width. It is the head; it
is the head at last that
Controls the Velocity
Q That means the grade?
A Yes, and the depth.
Q And such a River as the
Mississippi gets its Velocity
from the grade
A Very much I think.
Q That you think is an
established practice?
A That is generally recog-
nized, although Humphreys
and Abbot I believe in
there experiments Sometime
found that the bottom of
the Stream was moving
more rapidly than the
surface, which of course
was Anamolous.
Q I did not say anything
about that. Has the Mississ

1789

ippi River today really
any grade that is appreciable
A Well I have heard it said
- I never made the survey
myself - that it ran up
hill.
Q Has not the Mississippi
a strong current in it?
A Well I do not know. I
crossed the bridge over
the Mississippi but it was
in the night time and I
could not see the River
Q Has it not as strong a
current as the American River
A No.
Q Has not the Mississippi
River a three mile current?
A I think not. It may have
it but I think not. I do
not know. I think not
that.
Q What is the specific
gravity of that Cement as
you would take it
A The fine portions here -
Q (Interrupting) I mean of
the thing as a mass?

A Well I was going to speak
of that which I know; the
other I should have to give
merely as a Conjecture. The
Cement portion Containing
the finer sand, no pebble
as large as a pea, but in
fact impact matter is ~~2~~
as a whole number and
2.567 ~~2.567~~ as the decimal. That
was the original matter.
Q That was what?
A That was the original
matter as it comes from the
mine
Q From the mine?
A The Good Run
Q What did you say the
specific gravity was?
A What I told you 2.567
That is a little over two
~~feet~~ and a half. I presume
the Cobbles here would go
as high as 2.67. probably
they are; I do not know. I
merely venture that as an
assertion
Q What materials will water

take into Suspension, say
on a three or four mile
Current?
A Well I refer now to State
Engineer Halls report, where
he makes the Matter held
in suspension -
Q (Interrupting) I want to
know what it is?
Mr Dibble He is answering
your question
Witness He makes it one &
four tenths
Mr Edwalader I know he
says that; but you say
one nine tenths?
A I say it probably runs
as high as one nine tenths.
Q I want to know what
Material water will carry
in suspension with a three
mile Current?
A I say it will probably
Carry one & Nine tenths.
Q That is not what I
asked. What I want to know
is not what amount but
what Kind of Material

A Why it will Carry Material of one & nine tenths Specific gravity.
Q It will Carry sand will it not?
A It will depend on its Specific gravity. That sand might have a greater or less Specific gravity
Q Will it Carry Clay
A It will Carry Clay, Carry it readily I think
Q Will it Carry sand like that <Showing>
A No I do not think it will Carry that sand, That
X is too Coarse.
Q Never mind: I wont ask you about that, because I do not Know where it Came but this seems to be about the same thing <No 6> See whether that matter would travel with the water
A No I think not. It would not be Called silt
Q It has been testified here
1793 that the Sacramento River at

high stages will carry that sand in the top stratum, and a wave will throw it on the bank
A I testified so?
Q I say it has been testified in this case. So you think that is possible
A Oh in flood time it might. Of course in boiling so it might throw it up.
Q I am speaking about the usual movements of high waters as they go down past this City year after year; whether that kind of sand would be in the top stratum of the water?
A No I think not. It might be in the stream. I do not know exactly what the velocity would be. I see it is thrown up at the mouth of the American River, thrown some three or four feet in height, sand like that
Q You say it takes a current
11794 of how much an hour to

Move that Sand No 6
A Well a Mild Current I
think. A mile Current would
Move it along on the bottom
and not Carry it in Suspension
providing there were no Cement
quality in it. If there was
any Cement quality, of Course
that makes big Changes and
Changes the Whole problem
O When these writers speak of a
Current they do not speak
of a current at the bottom
do they, but speak of the
average Current
A In making our final estim-
ate to determine the quantity
of water Carried we get the
Mean Velocity. But when
we come to a stream in the
first place, if we are unable
to get the depth, we put a
block on it to float to de-
termine the Central Velocity.
If there is a deep stream
and we do not care about
accurate results we take
Rankine's process—

1390

Rankine's

Q. Rankine the Engineer
A. Yes. If it is a deep stream, say twelve feet, why the Surface Velocity would be about 5, then the mean velocity would be 4 and the bottom velocity would be 3.
But if it is a shallow stream say running from 4 to 5 feet, then the surface velocity will be in the ration of 4, the mean 3 and the bottom 2,
But we come at it more accurately when we use
Prony's Prony's formula, which is one of the best, and that is this—
Q. (Intg) I want to know whether in constructing these tables they took the bottom velocity or the mean velocity—
Mr Dibble (Intg) Let the witness complete his answer
Witness That is this: That the mean velocity is equal to the surface velocity multiplied into the quotient
11796 arising from dividing the

surface velocity increased by ~~7.77~~ 7.71, divided by the entrance velocity increased by 10.28. That gives the mean velocity

Q. I do not care anything about that but want to know whether in the construction of those tables when the velocity is given they took the bottom velocity, the top velocity, the mean velocity?

A. By all means, if we are treating of a coarse of sediment, bolders or cobble etc, it would be the bottom velocity.

Q. What do you say now; is it the bottom mean or top?

A. I do not suppose it ~~raises~~ makes in that way.

Q. Is it the bottom, the mean or the top?

A. That we are estimating, when we speak of the transporting power of the stream,

the bottom velocity
A. No. In the construction of these scientific tables relating to the transporting power of water over solids, is it the bottom the mean or the top velocity of the water that is used,
A. I suppose it is the velocity of the stream acting upon stones; it does not matter where that velocity is
Q. That is your answer.
Now you have stated
A. (Only) It would not take any other velocity
Q. Now you have given us the velocity necessary to carry the material in boxes 2 and 3? A By our system
Q. Which you say is about two miles an hour and you have given us the material in box 3 - that blue agate at about 4 miles an hour
The Court Number one?
11798 Mr Cadwalader Yes sir

Witness The coarser portion
Mr Cadwalader That
matter is constantly precipi
tated by 2000 inches of water
into the bed of the North
fork where there are several
thousand inches of water
more, on to a bed-rock
bottom or a bottom made
of cobbles and sand smooth
enough to lay a rail road
on without cutting or filling
and the grade is forty feet
per mile. What will be the
movement - what will be
rate of movement - of each
class of material - say,
taking bot number 2 first -
under such circumstances
Mr Dibble What is the
grade of that question?
Let us understand the
question
Mr Cadwalader Forty feet
Mr Dibble No: The grade
of that question
Mr Cadwalader Forty feet
Mr Dibble I should think

it was 40 feet
A. Judging of this material
Mr Cadwalader (Only) What
would be the rate of material
movement of material in
box No 3
A. I should think if it contained no cement — If it contained cement it would not
move so far —
Q. (Only) I should have
given you the current.
Say the current is 4 miles
an hour? A. Well
I think that would be —
Q. (Only) What would be
the rate of the movement
of the material in box
Number 3
A. Well I should think
probably it would carry
it might carry 50 per cent
of the weight of that,
and when it is 50 per cent
of it, it might carry it
away 6 miles
Q. That is not what I am
asking you. I was asking

11800

you. I was asking you what would be the rule of motion
A. How fast it would move?
Q. Yes. Of that material in box number 3
A. How much water in the weir, how deep the water and what the quantity of water
Q. Say there are 10000 inches of natural water and 2500 inches of artificial. That makes 12500 inches. You have got your plan and you know exactly what it is?
A. And that the 2500 inches fully charged with that material
Q. Was charged as you said it or as it naturally would be? A I did not see them working at all But I suppose, reduce it to thirds—
A. (Interg) Hold on a moment. We will suppose

the stream at Canyon Creek, without receiving any impetus or any aid from Hydraulic water, had that tumbled into 10000 inches of water moving over that plain. Now I want to know the rate of motion of material in box number 3.

Q. Please give me that question again there is so much of it.

(The reporter read)

Q. That is it. Down that stream on that grade

A. I understand you want to know how much it would retard the velocity of the current.

A. Yes? A. Is this 4 miles on the surface or at the bottom

Q. The mean? A. The mean velocity

A. How deep is it? How deep do you make the river

Q. From two to three feet.

11802 A. Then it would not be

over two feet on the bottom at the most

Q What? A. It would not be over 2 miles on the bottom; then the curve would not be over 2 miles on the bottom, by Rankine

Q. Now you have given us the rate of movement of that. Now take the next box, number two?

A. That would depend on the way you would put the material in. Now the material would probably slant, at least, I would say 25, 25 per cent — 20 to 25. That would be merely a conjecture.

Q. How fast would the material in box number two move? A. Well I should think that would slant it say 30 per cent.

Q How fast would the material called blue cement number one move?

A I do not think it would move that far because its character — it is of such a heavily cemented character. I have seen the operation on that. I have seen it cemented together and I know it does not move it to any considerable extent.

Q Then we will put it in this way: Under such circumstances you would find all that blue material at the mouth of Canyon Creek and you would find 70 per cent of both the other classes there?

A That I do not know. I crossed at Warners and I found there the material cemented —

Q I am not asking you that but does it not follow from your statement that the whole of number one would remain at the mouth of

Canyon Creek and 70 per cent
of the remainder?
A No. If the whole remained
there it would fill it up into
a pyramid. It would rise
into a wedge shape.
Q I am talking about this
material that I gave you
in order to find out the
law of its motion?
A Well the law of its motion
I suppose would be this which
I believe to be on the best data:
That at Warners for instance
the depth there is about 50 feet
and at Rices it is about
five feet deep. That would
show that ten per cent of
the material has passed over,
leaving 90 per cent.
Mr Earwaker I move to
strike that out. It is not
called for by any question
that I asked him?
The Witness I understood
that that was the very
thing.
The Court he asked you if

it would not be filled up
at the mouth of Canyon Creek
A No sir it would not fill
up. About One tenth of it
would pass over by Rices
bridge
Mr Cadwalader You would
find the heavy material then
nearest Canyon Creek would
you not
A You would find the heaviest
material nearest Canyon Creek
and you would find the
heaviest deposit at the mouth
of Canyon Creek. You would
find the heaviest material
and the heaviest deposit at the
mouth of Canyon Creek
Q And if you found 60
feet at Warner's bridge
you would have to find
more than that at the
mouth of Canon Creek?
A That would depend
on the fall. The original
fall, that would depend
on the fall from Canon
Creek to that point

Q Now Mr Witness, suppose it is true that there is no deposit there at all what would become of your theory of the movement? A Well that has been answered in advance Sir, that there is so much fall there that it could not lie there It could not lie in Cañon Creek on account of the great fall

Q Well you have never made any experiment have you, as to the movement of solids in water in your life?

A Stow?

Q You have never made any experiments? A No, not after the manner of Dubuat

Du Buat

Q Nor after the manner of anyone? A Yes, I have at times. I have thrown stones into a creek ~~and~~ to see if they

11807

would be moved

Q You talked to Mr Dibble about the law of the deposit of sedimentary matter. Did you ever make any experiments in order to know what that law was?

A I have learned the depths of the material at one point and then at another and from that I have deduced the law of deposition

Q. By means of a rod?

A By means of a rod?

Q yes A No sir. I could not do it by means of a rod. I took it from the testimony that was given and from observation

Q Observation when?

A I crossed at Warner's bridge and saw there the deposit – that there was a large deposit in the river. I ascertained which was afterwards

1808

put in evidence here and is in evidence that it was 50 feet there. I ascertained further that it was 5 feet at Rice's bridge 6½ miles below. Then we there obtained the ratio of 50 to 5 which is 1/10

Q You stated that there was no reliable way short of digging to ascertain how deep the deposit was?

A I did not so state it sir, but I stated that as a part of my proposition Do not garble my evidence if you please

Q Do you say that now?

A I say it to you, do not garble my evidence

Q Now? A Do not garble my evidence, not gobble-garble

Q I am trying not to do so and if you don't do it, I will not. Did you not state that nothing short of digging would be reliable?

And sir I said there was no other way except by digging or to ascertain from those conversant with the matter. If men have lived there and have made measurements and then gave them to you, you would accept them as true

2- Is that the way you put it?

A- That is the way I put it or substantially so.

2- You crossed at Warner's Bridge did you?

A- Yes I gave it that name because I did not know the old name of the bridge.

2- You gave it the right name? You think water will carry 2 percent of solid matter readily in its current?

A- That depends on the character. It depends on the velocity of the stream and character of the material.

2- You give a current two miles an hour- you say two miles an hour will

carry one and nine-tenths?
A- Two miles an hour?
2- Two miles an hour is what I understand you to take?
A- Yes I think it would
2- What did you mean by saying that there was no mica in the Gold Run Mine?
A- I said that I saw no mica there.
2- What is mica?
A- Well it is a mineral which is easily cleaved.
2- Is it made by water or fire? A- No I think it is
× of a primitive formation.
2- You think it is of primary formation? A- Yes, ~~primary~~ primitive
2- Is it of igneous or aqueous origin?
A- I think it is of igneous origin.
2- Made by fire?
× A- It is a primitive formation
2- And of igneous origin
A- Primitive rock rather
11811 not primary formation but

primitive rock.
2- It is primitive rock?
A- Yes.
2- Suppose mica decays what is the residuum?
A Well if it was resolved into its elements. If it was resolved- if that is what you mean- if it was resolved into its elements you would find potassium-
2 [Judge] It could not have any elements, if as you say it is primary? It could not have any elements?
A- I said it was a primitive rock.
2- I will ask you whether mica when it decomposes does not leave a residuum of clay?
A- No Sir I think not.
2- No? A- There might be some. It is composed partially of silica. I think there is a little alumina in it and likewise potash.
1892 I do not recollect the exact

component parts.
2- Is it not composed of clay and sand- clay, alumina
A- Clay may enter into its composition. I do not recollect.
2- What is silica?
A- Silica is the oxide of silicon.
2- Silica is the oxide of silicon? A- Yes
2- Is not silicon, sand?
A- Yes of course it is.
2- Is it not quartz?
A- Yes it is quartz.
2- Is it not glass?
A- Well artificially, yes. Sand enters into it- silica enters into it.
2- Did you find anything in that Mine except silicate of Alumina?
A- Silicate of alumina?
2- Yes? A- Well I found silica there and I found alumina there and I found potash there- I found a very small quantity
1803 2- Have you looked at

the sand rocks in that Mine?
A- No further than this cement.
I perceived sand here.
Q- I will ask you whether in that bank you did not see large masses of sand like this (indicates) some places being in a strata form?
A- How?
Q- Some places being in strata form?
A- You mean a stratafied formation there?
Q- Yes? A- No I did not observe any stratification I might have seen layers but hardly what would be called stratafied rock
Q- None of those banks are stratafied are they?
A- Oh! there might be of course.
Q- It never occurs in sedimentary rocks, stratification never occurs in them!
A- You mean to ask me that!

11894

Q- I am asking you?
A- Do you mean to ask that question?
Q- Yes. I ask you that?
A- Yes of course stratified rocks extend some fifty thousand feet in depth.
The Court You asked you with regard to sedimentary rocks?
A- Yes of course, as it is a water formation, an aqueous formation.
Mr. Leadwalader What are "slickens" composed of?
A- It is composed of sand finely communited. Finely communited silica. It may take in likewise some clay and it may not have clay as the case may be- earthy matter.
Q- Would it be slickens without the clay?
A- I so understand it most assuredly- even without the clay.
Q- Sand will not make

11895

slickens? A- Yes
2- Do you not know that slickens is generally called slickenside alumina?
A- I do not know that
2- Do you know that sand and clay - clay holding the water and binding the mass together form slickens. Did you ever see any slickens?
A- The term slickens seems to be used quite loosely in California. The noun silich - s-l-i-c-h was used to signify the small matter in a vein, was used as I understand it first in England. That is where I first came across it. It is vein matter and of course where it is reduced it becomes very much like paste. It is slimy and pasty like - a pasty substance
2- Where does the silich stuff
11896 come from or the sticky

stuff. Does it come from the sand exclusively?
A- When sand is finely ground, finely reduced, finely comminuted, so that it has no more feel, not grit to it only that would constitute the slick of which I have spoken. Slickens is simply the plural. As well as clay- clay would be the same thing but clay is not a necessity in the formation of slickens
Q- It is not?
A- No Sir it is not.
Q- You are sure of that are you?
A- Sure. Slate, argillaceous slate, talcose slate, all earthy matter when finely comminuted may form slickens
Q- You spoke very glibly about micaceous sand, what is it? A- It is quartz if you please, or silica with mica in it.
Q- Silicate of what?
A- I did not say silicate per, I said silica. Not

11817

silicate bit quartz sand
2- Have know mica
when you see it?
A- Yes.

2. How do you distinguish it?
A Well it is transparent, or translucent. It is in scale and has a defined cleavage which is readily developed.

2. Did you find the bed of the North Fork graded with cobblestones?
A- There was was some where I crossed, there were some cobbles. There was cobble and sand and pebbles. There were some cobbles there and some pebbles.

2. Did you or not say that Shekem had some of the elements of good soil in it, or all of the elements of good soil?

A I did not say all. I said it had the elements of good soil

2 It has two of the elements of soil in it — What is it deficient in as a matter of plant food?

A I do not know as it is deficient in anything

2 Do you know the elements of Shekem, do you know what it is composed of?

A I have said that it may be composed entirely of silica

2 Did you ever make a chemical analysis of it?

A I have never done it myself, no sir

2 You do not know whether it is deficient in Potash or Nitrogen do you?

A Well, as I said the word Shekem is used loosely

Q. I ask you if it is deficient in potash, phosphorus, or nitrogen?

A. But I wish to get at a starting point first.

Q. Well, just answer that question. It dont need any starting point in that respect.

A. I will not answer at random, that would be simply answering at random. We want first to understand what Chickens are.

Q. You stated that Chickens were land?

A. Chickens I said might be entirely composed of land. As found in California, but finely comminuted, so that it would be like soap stone to the touch. And it may contain phosphorus, it may contain clay; it may contain every element to make a fertilizer and yet it may contain only land, if it contains only land, only silica I should say then it would not make as good a fertilizer

11830

as if it contained polash, or phosphorus or alumina.

2 Well, does it contain any alumina? A It frequently does

2 What is alumina?

A Alumina is the oxide of aluminum

2 What is the color?

A They clay - when it appears in the form of clay it is generally of a light color, frequently a bluish cast.

2 Is it vegetable or mineral

A Well, it is generally accepted as mineral. You might think otherwise

2 It is both?

A I said that you might regard it as vegetable, but I regard it as mineral

2. Do you get that information from Mr. Smith that alumina was vegetable?

A No sir. I have never heard him use the word that I recollect of

2. Did you see any of that

Material in the Goer Run
mine? A I do not
recollect of so doing, but I
may. I can not say, sir.
Q Has that got any mica
in it? A There not
a very powerful glass (Exam-
ining) just say a common
eye-glass, yes, I think there
is a trace of mica there sir.
Q. Now if that came from
the Goer Run mine, that mine
would really contain mica
would it not? A. It would
if this piece were there, if it
belonged there.
Q would you be able to recog-
nize a photograph of the
walls of that mine if you
saw it? A I doubt if I
could. I might be able to so
do, but I could not say that
I could.
Q You did not make your ob-
servations close enough to fix
it in your memory?
A No I think there are some
sulphides of iron in this that

11832
+

Sulphides

may be mistaken for mica.

2. Is there any humus in Stickens?

A. I do not know, but you have the advantage of me in that word.

2 Did you not say that you had studied Chemistry, and had made Chemical analyses?

A. Yes sir, but I do not recollect the definition of that word.

2 You say that you had made Chemical analyses?

A I did not say so.

2 Well here you — do you know anything about Chemistry?

A I have studied Chemistry tolerably.

2 Well, is that part of your calling. Are you a Chemist?

A No, I do not profess to be a Chemist sir.

2 Is there any vegetable mold in the matter that comes out of the Gold Run mine?

A Now I understand you. at first you were speaking in Latin — there is none

11823

Chet. I recognize none that I saw.

Q. Did you see anything there, that would be manure in such a sense as you understand that word?

A I did not

Q Now you joined that pleasure party, didn't you, in that excursion around the bay of San Francisco in October last?

A I was with a party that were in the bay.

Q It was on the 6th day of November, was it not?

A On the Empire City, I was not aware that it was a pleasure party however, I thought it was a party of Exploration & investigation

Q What route did you take?

A We went up the Petaluma Creek, then down and came along off the mouth of Sonoma Creek and some other little creeks in there that I do not recollect the names of

Q And then returned to San

1824

Francisco: A Then returned to San Francisco, yes sir

Q. How near to the route that you went up on?
A Well, it was some distance I think we went up my recollection is that we went up on the left, kept farther in toward the left going up and then when we came down we came more in —

Q (Intg) Mr O'Brien said that the return trip was about 1000 yards or a 1000 feet I forget which from the up trip:
A I think it was more than that sir, my recollection is that it was far more than that, in fact I measured it from the map I do not know whether it is here or

11825 not — on the chart

Q Yu were after black mud were yu not?
And yu found it around the mouth of Petaluma Creek?
A I was not after black mud any more than anything else. We wanted to ascertain facts. Whether it was black mud or grey mud or sand or whatever it was.

Q Did yu take any soundings off Angel Island?
A No I think not.
Q Yu gave Angel Island the go by. Then yu went to the mouth of Petaluma Creek. What time did yu get there?
A I can not tell the hour. It was I think probably 12 o'clock
Q Then yu went to the mouth of Sonoma Creek? What time

did you get there?
A We kept off the mouth
2 What time did you get there? A I can not recollect the time
2 What time did you get back to San Francisco?
A We got back before dark, my recollection is
2 You do not know your route down, do you?
A. No, I never not trace it.
2 Did you go within 10 miles of Point Pinole?
A Yes sir, if I had a chart I could readily tell you (Witness Examines chart)

— " —

Recess until 2 o'clock. P. M.